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Astounding SCIENCE FICTION



Omnilingual BY H. BEAM PIPER

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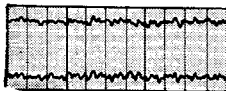
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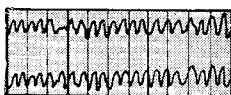
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LIMITATION OF METHOD

Tell a human being "You can't do that!" and there's an automatic, built-in reaction that makes him start trying to figure out how to make a liar of you. That reaction is, of course, why Man rules this planet; it's a very fine and useful thing indeed. But it does make people reject any statement of limitation—even when the statement is fully valid, and is, actually, useful and helpful. Most of us have, at various times, felt acutely frustrated by our limitation of not being able to pass through solid matter. But various science-fiction stories have pointed out that, given a Little Whizz-Dandy Interpenetrator, you'd have quite a time *not* falling through the floor. We need limitations.

As a matter of fact, all we are and all we have is based on, built on, and useful only because of limitations. Steel is useful because its rigidity, hardness and strength limit its flexibility, penetrability and breakability. Wheels are useful because they do not limit the horizon-

tal movement of an axle, but do limit its vertical movement.

A gas is characterized by having practically no limitations. Try building something out of gas, and nothing but gas! (No fair talking about interstellar quantities of gas; there the major limitation of gas—its mass—becomes important, and you're building not with gas, but with gravitic field limitations.)

There's a deep resentment of limitations in every man—but take a careful look at that feeling in yourself, and you may notice that you approve of the limitations that limit Tog—The Other Guy—as being decent, proper, sensible, and necessary. It's largely the limitations that limit what you are trying to do that cause that tension of frustration. It's not limitations that are bad; they're the essential structural members of which a Universe must be built.

Man's problem is to turn that pile of jackstraw limitations into an organized, useful structure—to use

limitations, not to be misused by them.

Alnico is a wonderful magnetic material. Aluminum certainly isn't a magnetic material; it helps make alnico the potent stuff it is, though, because aluminum atoms are so thoroughly out of place in an iron crystal; the aluminum atoms cause a major log-jam in the crystalization process of the iron-nickel-cobalt alloy, and limit the freedom of the ferrous metal crystals to realign themselves.

Take a look at it, and you'll find that limitations are the strong, useful rigidities of our whole structure of understanding; they are the solid and useful framework on which we build.

When we speak of "sound, clear thinking," we're using a phrase that is one of those "You know what I mean," items. Try defining that concept in terms a computer machine could use! (The fact that we can't is precisely why the computer can *not* "know what we mean," of course!)

I can't define it; generally, it is used to differentiate in a broad, rather loose way between "sound, clear thinking" and wild guessing, untrammled and undisciplined imagination, happy delusions, and a general refusal to accept any limitation whatever on the "right to my own opinion."

"Sound, clear thinking" means, basically, processes of idea and concept generation and manipulation which are organized, disciplined,

systematized, and clearly, communicably defined. Processes that are, in other words, methodical—and limited. It is held that they must be consistent, and clearly, unambiguously defined.

Each of those requirements is, actually, a statement of limitation. Consistency imposes a very marked limitation. Unambiguity imposes a limitation. Method implies these same factors at a broader level.

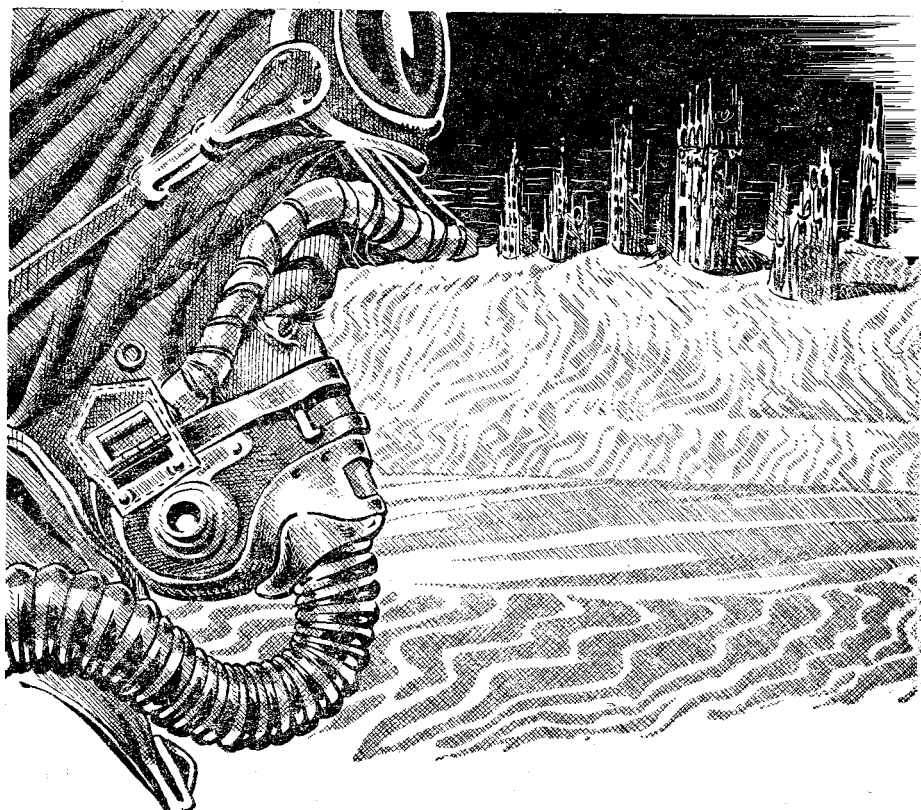
There is, however, a crippling limitation involved in this concept; given any single, clearly-defined and self-consistent method of thinking, or process of problem-solving, it is always possible to design a problem that *that* method of problem-analysis can not solve. That proposition can be—and has been—expanded and analyzed logically; it is valid.

The Scientific Method is an organized, self-consistent method of problem-analysis.

It is, therefore, inherently possible to design a problem which can not *ever* be solved by the organized, defined method known as "The Scientific Method." Establish *any* system of rules of acceptable, logical, disciplined problem-analysis, and automatically, inescapably, you must also establish a class of methods that *are not* admissible, acceptable, et cetera, within the field. Under the rules of logic-as-we-know-it, if you state "A exists and has these characteristics," you must imply a class B which is-not-A.

If there exists a class of thought-

(Continued on page 155)



OMNILINGUAL

To translate writings, you need a key to the code—and if the last writer of Martian died forty thousand years before the first writer of Earth was born...how could the Martian be translated...?

BY H. BEAM PIPER

Illustrated by Freas



Martha Dane paused, looking up at the purple-tinged copper sky. The wind had shifted since noon, while she had been inside, and the dust storm that was sweeping the high deserts to the east was now blowing out over Syrtis. The sun, magnified by the haze, was a gorgeous magenta ball, as large as the sun of Terra, at which she could look directly. Tonight, some of that dust would come sifting down from the upper atmosphere to add another film to what had been burying the city for the last fifty thousand years.

OMNILINGUAL

The red loess lay over everything, covering the streets and the open spaces of park and plaza, hiding the small houses that had been crushed and pressed flat under it and the rubble that had come down from the tall buildings when roofs had caved in and walls had toppled outward. Here where she stood, the ancient streets were a hundred to a hundred and fifty feet below the surface; the breach they had made in the wall of the building behind her had opened into the sixth story. She could look down on the cluster of prefabricated huts and sheds, on the brush-grown flat that had been the waterfront when this place had been a seaport on the ocean that was now Syrtis Depression; already, the bright metal was thinly coated with red dust. She thought, again, of what clearing this city would mean, in terms of time and labor, of people and supplies and equipment brought across fifty million miles of space. They'd have to use machinery; there was no other way it could be done. Bulldozers and power shovels and draglines; they were fast, but they were rough and indiscriminate. She remembered the digs around Harappa and Mohenjo-Daro, in the Indus Valley, and the careful, patient native laborers—the painstaking foremen, the pickmen and spademen, the long files of basketmen carrying away the earth. Slow and primitive as the civilization whose ruins they were uncovering, yes, but she could count on the fingers of one hand the times

one of her pickmen had damaged a valuable object in the ground. If it hadn't been for the underpaid and uncomplaining native laborer, archaeology would still be back where Wincklemann had found it. But on Mars there was no native labor; the last Martian had died five hundred centuries ago.

Something started banging like a machine gun, four or five hundred yards to her left. A solenoid jackhammer; Tony Lattimer must have decided which building he wanted to break into next. She became conscious, then, of the awkward weight of her equipment, and began redistributing it, shifting the straps of her oxy-tank pack, slinging the camera from one shoulder and the board and drafting tools from the other, gathering the notebooks and sketchbooks under her left arm. She started walking down the road, over hillocks of buried rubble, around snags of wall jutting up out of the loess, past buildings still standing, some of them already breached and explored, and across the brush-grown flat to the huts.

There were ten people in the main office room of Hut One when she entered. As soon as she had disposed of her oxygen equipment, she lit a cigarette, her first since noon, then looked from one to another of them. Old Selim von Ohlmhorst, the Turco-German, one of her two fellow archaeologists, sitting at the end of the long table against the farther wall, smoking his big

curved pipe and going through a looseleaf notebook. The girl ordnance officer, Sachiko Koremitsu, between two droplights at the other end of the table, her head bent over her work. Colonel Hubert Penrose, the Space Force CO, and Captain Field, the intelligence officer, listening to the report of one of the air-dyne pilots, returned from his afternoon survey flight. A couple of girl lieutenants from Signals, going over the script of the evening telecast, to be transmitted to the *Cyrano*, on orbit five thousand miles off planet and relayed from thence to Terra via Lunar. Sid Chamberlain, the Trans-Space News Service man, was with them. Like Selim and herself, he was a civilian; he was advertising the fact with a white shirt and a sleeveless blue sweater. And Major Lindemann, the engineer officer, and one of his assistants, arguing over some plans on a drafting board. She hoped, drawing a pint of hot water to wash her hands and sponge off her face, that they were doing something about the pipeline.

She started to carry the notebooks and sketchbooks over to where Selim von Ohlmhorst was sitting, and then, as she always did, she turned aside and stopped to watch Sachiko. The Japanese girl was restoring what had been a book, fifty thousand years ago; her eyes were masked by a binocular loup, the black headband invisible against her glossy black hair, and she was picking delicately at the crumbled page

with a hair-fine wire set in a handle of copper tubing. Finally, loosening a particle as tiny as a snowflake, she grasped it with tweezers, placed it on the sheet of transparent plastic on which she was reconstructing the page, and set it with a mist of fixative from a little spraygun. It was a sheer joy to watch her; every movement was as graceful and precise as though done to music after being rehearsed a hundred times.

"Hello, Martha. It isn't cocktail-time yet, is it?" The girl at the table spoke without raising her head, almost without moving her lips, as though she were afraid that the slightest breath would disturb the flaky stuff in front of her.

"No, it's only fifteen-thirty. I finished my work, over there. I didn't find any more books, if that's good news for you."

Sachiko took off the loup and leaned back in her chair, her palms cupped over her eyes.

"No, I like doing this. I call it micro-jigsaw puzzles. This book, here, really is a mess. Selim found it lying open, with some heavy stuff on top of it; the pages were simply crushed. She hesitated briefly. "If only it would mean something, after I did it."

There could be a faintly critical overtone to that. As she replied, Martha realized that she was being defensive.

"It will, some day. Look how long it took to read Egyptian hieroglyphics, even after they had the Rosetta Stone."

Sachiko smiled. "Yes, I know. But they did have the Rosetta Stone."

"And we don't. There is no Rosetta Stone, not anywhere on Mars. A whole race, a whole species, died while the first Cr -Magnon cave-artist was daubing pictures of reindeer and bison, and across fifty thousand years and fifty million miles there was no bridge of understanding.

"We'll find one. There must be something, somewhere, that will give us the meaning of a few words, and we'll use them to pry meaning out of more words, and so on. We may not live to learn this language, but we'll make a start, and some day somebody will."

Sachiko took her hands from her eyes, being careful not to look toward the unshaded lights, and smiled again. This time Martha was sure that it was not the Japanese smile of politeness, but the universally human smile of friendship.

"I hope so, Martha; really I do. It would be wonderful for you to be the first to do it, and it would be wonderful for all of us to be able to read what these people wrote. It would really bring this dead city to life again." The smile faded slowly. "But it seems so hopeless."

"You haven't found any more pictures?"

Sachiko shook her head. Not that it would have meant much if she had. They had found hundreds of pictures with captions; they had

never been able to establish a positive relationship between any pictured object and any printed word. Neither of them said anything more, and after a moment Sachiko replaced the loup and bent her head forward over the book.

Selim von Ohlmhorst looked up from his notebook, taking his pipe out of his mouth.

"Everything finished, over there?" he asked, releasing a puff of smoke.

"Such as it was." She laid the notebooks and sketches on the table. "Captain Gicquel's started airsealing the building from the fifth floor down, with an entrance on the sixth; he'll start putting in oxygen generators as soon as that's done. I have everything cleared up where he'll be working."

Colonel Penrose looked up quickly, as though making a mental note to attend to something later. Then he returned his attention to the pilot, who was pointing something out on a map.

Von Ohlmhorst nodded. "There wasn't much to it, at that," he agreed. "Do you know which building Tony has decided to enter next?"

"The tall one with the conical thing like a candle extinguisher on top, I think. I heard him drilling for the blasting shots over that way."

"Well, I hope it turns out to be one that was occupied up to the end."

The last one hadn't. It had been

stripped of its contents and fittings, a piece of this and a bit of that, haphazardly, apparently over a long period of time, until it had been almost gutted. For centuries, as it had died, this city had been consuming itself by a process of auto-cannibalism. She said something to that effect.

"Yes. We always find that—except, of course, at places like Pompeii. Have you seen any of the other Roman cities in Italy?" he asked. "Minturnae, for instance? First the inhabitants tore down this to repair that, and then, after they had vacated the city, other people came along and tore down what was left, and burned the stones for lime, or crushed them to mend roads, till there was nothing left but the foundation traces. That's where we are fortunate; this is one of the places where the Martian race perished, and there were no barbarians to come later and destroy what they had left." He puffed slowly at his pipe. "Some of these days, Martha, we are going to break into one of these buildings and find that it was one in which the last of these people died. Then we will learn the story of the end of this civilization."

And if we learn to read their language, we'll learn the whole story, not just the obituary. She hesitated, not putting the thought into words. "We'll find that, sometime, Selim," she said, then looked at her watch. "I'm going to get some more work done on my lists, before dinner."

ASTOUNDING SCIENCE FICTION

For an instant, the old man's face stiffened in disapproval; he started to say something, thought better of it, and put his pipe back into his mouth. The brief wrinkling around his mouth and the twitch of his white mustache had been enough, however; she knew what he was thinking. She was wasting time and effort, he believed; time and effort belonging not to herself but to the expedition. He could be right, too, she realized. But he had to be wrong; there had to be a way to do it. She turned from him silently and went to her own packing-case seat, at the middle of the table.

Photographs, and photostats of restored pages of books, and transcripts of inscriptions, were piled in front of her, and the notebooks in which she was compiling her lists. She sat down, lighting a fresh cigarette, and reached over to a stack of unexamined material, taking off the top sheet. It was a photostat of what looked like the title page and contents of some sort of a periodical. She remembered it; she had found it herself, two days before, in a closet in the basement of the building she had just finished examining.

She sat for a moment, looking at it. It was readable, in the sense that she had set up a purely arbitrary but consistently pronounceable system of phonetic values for the letters. The long vertical symbols were vowels. There were only ten of them; not too many, allowing separate charac-

ters for long and short sounds. There were twenty of the short horizontal letters, which meant that sounds like -ng or -ch or -sh were single letters. The odds were millions to one against her system being anything like the original sound of the language, but she had listed several thousand Martian words, and she could pronounce all of them.

And that was as far as it went. She could pronounce between three and four thousand Martian words, and she couldn't assign a meaning to one of them. Selim von Ohlmhorst believed that she never would. So did Tony Lattimer, and he was a great deal less reticent about saying so. So, she was sure, did Sachiko Koremitsu. There were times, now and then, when she began to be afraid that they were right.

The letters on the page in front of her began squirming and dancing, slender vowels with fat little consonants. They did that, now, every night in her dreams. And there were other dreams, in which she read them as easily as English; waking, she would try desperately and vainly to remember. She blinked, and looked away from the photostated page; when she looked back, the letters were behaving themselves again. There were three words at the top of the page, over-and-underlined, which seemed to be the Martian method of capitalization. *Mastharnorvod Tadavas Sornbulva*. She pronounced them mentally, leafing through her notebooks to see if she had encountered them before,

and in what contexts. All three were listed. In addition; *mashtar* was a fairly common word, and so was *norvod*, and so was *nor*, but *-vod* was a suffix and nothing but a suffix. *Davas*, was a word, too, and *ta-* was a common prefix; *sorn* and *bulva* were both common words. This language, she had long ago decided, must be something like German; when the Martians had needed a new word, they had just pasted a couple of existing words together. It would probably turn out to be a grammatical horror. Well, they had published magazines, and one of them had been called *Mashtarnorvod Tadavas Sornbulva*. She wondered if it had been something like the *Quarterly Archaeological Review*, or something more on the order of *Sexy Stories*.

A smaller line, under the title, was plainly the issue number and date; enough things had been found numbered in series to enable her to identify the numerals and determine that a decimal system of numeration had been used. This was the one thousand and seven hundred and fifty-fourth issue, for Doma, 14837; then Doma must be the name of one of the Martian months. The word had turned up several times before. She found herself puffing furiously on her cigarette as she leafed through notebooks and piles of already examined material.

Sachiko was speaking to somebody, and a chair scraped at the end of the table. She raised her

head, to see a big man with red hair and a red face, in Space Force green, with the single star of a major on his shoulder, sitting down. Ivan Fitzgerald, the medic. He was lifting weights from a book similar to the one the girl ordnance officer was restoring.

"Haven't had time, lately," he was saying, in reply to Sachiko's question. "The Finchley girl's still down with whatever it is she has, and it's something I haven't been able to diagnose yet. And I've been checking on bacteria cultures, and in what spare time I have, I've been dissecting specimens for Bill Chandler. Bill's finally found a mammal. Looks like a lizard, and it's only four inches long, but it's a real warm-blooded, gamogenetic, placental, viviparous mammal. Burrows, and seems to live on what pass for insects here."

"Is there enough oxygen for anything like that?" Sachiko was asking.

"Seems to be, close to the ground." Fitzgerald got the headband of his loup adjusted, and pulled it down over his eyes. "He found this thing in a ravine down on the sea bottom— Ha, this page seems to be intact; now, if I can get it out all in one piece—"

He went on talking inaudibly to himself, lifting the page a little at a time and sliding one of the transparent plastic sheets under it, working with minute delicacy. Not the delicacy of the Japanese girl's small hands, moving like the paws of a

cat washing her face, but like a steam-hammer cracking a peanut. Field archaeology requires a certain delicacy of touch, too, but Martha watched the pair of them with envious admiration. Then she turned back to her own work, finishing the table of contents.

The next page was the beginning of the first article listed; many of the words were unfamiliar. She had the impression that this must be some kind of scientific or technical journal; that could be because such publications made up the bulk of her own periodical reading. She doubted if it were fiction; the paragraphs had a solid, factual look.

At length, Ivan Fitzgerald gave a short, explosive grunt.

"Ha! Got it!"

She looked up. He had detached the page and was cementing another plastic sheet onto it.

"Any pictures?" she asked.

"None on this side. Wait a moment." He turned the sheet. "None on this side, either." He sprayed another sheet of plastic to sandwich the page, then picked up his pipe and relighted it.

"I get fun out of this, and it's good practice for my hands, so don't think I'm complaining," he said, "but, Martha, do you honestly think anybody's ever going to get anything out of this?"

Sachiko held up a scrap of the silicone plastic the Martians had used for paper with her tweezers. It was almost an inch square.

"Look; three whole words on

this piece," she crowed. "Ivan, you took the easy book."

Fitzgerald wasn't being sidetracked. "This stuff's absolutely meaningless," he continued. "It had a meaning fifty thousand years ago, when it was written, but it has none at all now."

She shook her head. "Meaning isn't something that evaporates with time," she argued. "It has just as much meaning now as it ever had. We just haven't learned how to decipher it."

"That seems like a pretty pointless distinction," Selim von Ohlmhorst joined the conversation. "There no longer exists a means of deciphering it."

"We'll find one." She was speaking, she realized, more in self-encouragement than in controversy.

"How? From pictures and captions? We've found captioned pictures, and what have they given us? A caption is intended to explain the picture, not the picture to explain the caption. Suppose some alien to our culture found a picture of a man with a white beard and mustache sawing a billet from a log. He would think the caption meant, 'Man Sawing Wood.' How would he know that it was really 'Wilhelm II in Exile at Doorn'?"

Sachiko had taken off her loup and was lighting a cigarette.

"I can think of pictures intended to explain their captions," she said. "These picture language-books, the sort we use in the Service—little

line drawings, with a word or phrase under them."

"Well, of course, if we found something like that," von Ohlmhorst began.

"Michael Ventris found something like that, back in the Fifties," Hubert Penrose's voice broke in from directly behind her.

She turned her head. The colonel was standing by the archaeologists' table; Captain Field and the airdyne pilot had gone out.

"He found a lot of Greek inventories of military stores," Penrose continued. "They were in Cretan Linear B script, and at the head of each list was a little picture, a sword or a helmet or a cooking tripod or a chariot wheel. That's what gave him the key to the script."

"Colonel's getting to be quite an archaeologist," Fitzgerald commented. "We're all learning each others' specialties, on this expedition."

"I heard about that long before this expedition was even contemplated." Penrose was tapping a cigarette on his gold case. "I heard about that back before the Thirty Days' War, at Intelligence School, when I was a lieutenant. As a feat of cryptanalysis, not an archaeological discovery."

"Yes, cryptanalysis," von Ohlmhorst pounced. "The reading of a known language in an unknown form of writing. Ventris' lists were in the known language, Greek. Neither he nor anybody else ever read a word of the Cretan language

until the finding of the Greek-Cretan bilingual in 1963, because only with a bilingual text, one language already known, can an unknown ancient language be learned. And what hope, I ask you, have we of finding anything like that here? Martha, you've been working on these Martian texts ever since we landed here—for the last six months. Tell me, have you found a single word to which you can positively assign a meaning?"

"Yes, I think I have one." She was trying hard not to sound too exultant. "*Doma*. It's the name of one of the months of the Martian calendar."

"Where did you find that?" von Ohlmhorst asked. "And how did you establish—?"

"Here." She picked up the photostat and handed it along the table to him. "I'd call this the title page of a magazine."

He was silent for a moment, looking at it. "Yes. I would say so, too. Have you any of the rest of it?"

"I'm working on the first page of the first article, listed there. Wait till I see; yes, here's all I found, together, here." She told him where she had gotten it. "I just gathered it up, at the time, and gave it to Geoffrey and Rosita to photostat; this is the first I've really examined it."

The old man got to his feet, brushing tobacco ashes from the front of his jacket, and came to where she was sitting, laying the title page on the table and leafing



quickly through the stack of photostats.

"Yes, and here is the second article, on page eight, and here's the next one." He finished the pile of photostats. "A couple of pages missing at the end of the last article. This is remarkable; surprising that a thing like a magazine would have survived so long."

"Well, this silicone stuff the Martians used for paper is pretty durable," Hubert Penrose said. "There doesn't seem to have been any water or any other fluid in it originally, so it wouldn't dry out with time."

"Oh, it's not remarkable that the material would have survived. We've found a good many books and papers in excellent condition. But only a really vital culture, an organized culture, will publish magazines, and this civilization had been dying for hundreds of years before the end. It might have been a thousand years before the time they died out completely that such activities as publishing ended."

"Well, look where I found it; in a closet in a cellar. Tossed in there and forgotten, and then ignored

when they were stripping the building. Things like that happen."

Penrose had picked up the title page and was looking at it.

"I don't think there's any doubt about this being a magazine, at all." He looked again at the title, his lips moving silently. "*Mastbarnorvod Tadavas Sornhulva*. Wonder what it means. But you're right about the date—*Doma* seems to be the name of a month. Yes, you have a word, Dr. Dane."

Sid Chamberlain, seeing that something unusual was going on, had come over from the table at which he was working. After examining the title page and some of the inside pages, he began whispering into the stenophone he had taken from his belt.

"Don't try to blow this up to anything big, Sid," she cautioned. "All we have is the name of a month, and Lord only knows how long it'll be till we even find out which month it was."

"Well, it's a start, isn't it?" Penrose argued. "Grotefend only had the word for 'king' when he started reading Persian cuneiform."

"But I don't have the word for month; just the name of a month. Everybody knew the names of the Persian kings, long before Grotefend."

"That's not the story," Chamberlain said. "What the public back on Terra will be interested in is finding out that the Martians published magazines, just like we do. Some-

thing familiar; make the Martians seem more real. More human."

Three men had come in, and were removing their masks and helmets and oxy-tanks, and peeling out of their quilted coveralls. Two were Space Force lieutenants; the third was a youngish civilian with close-cropped blond hair, in a checked woolen shirt. Tony Lattimer and his helpers.

"Don't tell me Martha finally got something out of that stuff?" he asked, approaching the table. He might have been commenting on the antics of the village half-wit, from his tone.

"Yes; the name of one of the Martian months." Hubert Penrose went on to explain, showing the photostat.

Tony Lattimer took it, glanced at it, and dropped it on the table.

"Sounds plausible, of course, but just an assumption. That word may not be the name of a month, at all—could mean 'published' or 'authorized' or 'copyrighted' or anything like that. Fact is, I don't think it's more than a wild guess that that thing's anything like a periodical." He dismissed the subject and turned to Penrose. "I picked out the next building to enter; that tall one with the conical thing on top. It ought to be in pretty good shape inside; the conical top wouldn't allow dust to accumulate, and from the outside nothing seems to be caved in or crushed. Ground level's higher than the other one, about the seventh

floor. I found a good place and drilled for the shots; tomorrow I'll blast a hole in it, and if you can spare some people to help, we can start exploring it right away."

"Yes, of course, Dr. Lattimer. I can spare about a dozen, and I suppose you can find a few civilian volunteers," Penrose told him. "What will you need in the way of equipment?"

"Oh, about six demolition-packets; they can all be shot together. And the usual thing in the way of lights, and breaking and digging tools, and climbing equipment in case we run into broken or doubtful stairways. We'll divide into two parties. Nothing ought to be entered for the first time without a qualified archaeologist along. Three parties, if Martha can tear herself away from this catalogue of systematized incomprehensibilities she's making long enough to do some real work."

She felt her chest tighten and her face become stiff. She was pressing her lips together to lock in a furious retort when Hubert Penrose answered for her.

"Dr. Dane's been doing as much work, and as important work, as you have," he said brusquely. "More important work, I'd be inclined to say."

Von Ohlmhorst was visibly distressed; he glanced once toward Sid Chamberlain, then looked hastily away from him. Afraid of a story of dissension among archaeologists getting out.

"Working out a system of pronunciation by which the Martian language could be transliterated was a most important contribution," he said. "And Martha did that almost unassisted."

"Unassisted by Dr. Lattimer, anyway," Penrose added. "Captain Field and Lieutenant Koremitsu did some work, and I helped out a little, but nine-tenths of it she did herself."

"Purely arbitrary," Lattimer disdained. "Why, we don't even know that the Martians could make the same kind of vocal sounds we do."

"Oh, yes, we do," Ivan Fitzgerald contradicted, safe on his own ground. "I haven't seen any actual Martian skulls—these people seem to have been very tidy about disposing of their dead—but from statues and busts and pictures I've seen, I'd say that their vocal organs were identical with our own."

"Well, grant that. And grant that it's going to be impressive to rattle off the names of Martian notables whose statues we find, and that if we're ever able to attribute any place-names, they'll sound a lot better than this horse-doctors' Latin the old astronomers splashed all over the map of Mars," Lattimer said. "What I object to is her wasting time on this stuff, of which nobody will ever be able to read a word if she fiddles around with those lists till there's another hundred feet of loess on this city, when there's so much real work to be done and we're as short-handed as we are."

That was the first time that had come out in just so many words. She was glad Lattimer had said it and not Selim von Ohlmhorst.

"What you mean," she retorted, "is that it doesn't have the publicity value that digging up statues has."

For an instant, she could see that the shot had scored. Then Lattimer, with a side glance at Chamberlain, answered:

"What I mean is that you're trying to find something that any archaeologist, yourself included, should know doesn't exist. I don't object to your gambling your professional reputation and making a laughing stock of yourself; what I object to is that the blunders of one archaeologist discredit the whole subject in the eyes of the public."

That seemed to be what worried Lattimer most. She was framing a reply when the communication-outlet whistled shrilly, and then squawked: "Cocktail time! One hour to dinner; cocktails in the library, Hut Four!"

The library, which was also lounge, recreation room, and general gathering-place, was already crowded; most of the crowd was at the long table topped with sheets of glasslike plastic that had been wall panels out of one of the ruined buildings. She poured herself what passed, here, for a martini, and carried it over to where Selim von Ohlmhorst was sitting alone.

For a while, they talked about the building they had just finished ex-

ploring, then drifted into reminiscences of their work on Terra—von Ohlmhorst's in Asia Minor, with the Hittite Empire, and hers in Pakistan, excavating the cities of the Harappa Civilization. They finished their drinks—the ingredients were plentiful; alcohol and flavoring extracts synthesized from Martian vegetation—and von Ohlmhorst took the two glasses to the table for refills.

"You know, Martha," he said, when he returned, "Tony was right about one thing. You are gambling your professional standing and reputation. It's against all archaeological experience that a language so completely dead as this one could be deciphered. There was a continuity between all the other ancient languages—by knowing Greek, Champollion learned to read Egyptian; by knowing Egyptian, Hittite was learned. That's why you and your colleagues have never been able to translate the Harappa hieroglyphics; no such continuity exists there. If you insist that this utterly dead language can be read, your reputation will suffer for it."

"I heard Colonel Penrose say, once, that an officer who's afraid to risk his military reputation seldom makes much of a reputation. It's the same with us. If we really want to find things out, we have to risk making mistakes. And I'm a lot more interested in finding things out than I am in my reputation."

She glanced across the room, to where Tony Lattimer was sitting

with Gloria Standish, talking earnestly, while Gloria sipped one of the counterfeit martinis and listened. Gloria was the leading contender for the title of Miss Mars, 1996, if you liked big bosomy blondes, but Tony would have been just as attentive to her if she'd looked like the Wicked Witch in "The Wizard of Oz," because Gloria was the Pan-Federation Telecast System commentator with the expedition.

"I know you are," the old Turco-German was saying. "That's why, when they asked me to name another archaeologist for this expedition, I named you."

He hadn't named Tony Lattimer; Lattimer had been pushed onto the expedition by his university. There'd been a lot of high-level string-pulling to that; she wished she knew the whole story. She'd managed to keep clear of universities and university politics; all her digs had been sponsored by non-academic foundations or art museums.

"You have an excellent standing; much better than my own, at your age. That's why it disturbs me to see you jeopardizing it by this insistence that the Martian language can be translated. I can't, really, see how you can hope to succeed."

She shrugged and drank some more of her cocktail, then lit another cigarette. It was getting tiresome to try to verbalize something she only felt.

"Neither do I, now, but I will. Maybe I'll find something like the

picture-books Sachiko was talking about. A child's primer, maybe; surely they had things like that. And if I don't, I'll find something else. We've only been here six months. I can wait the rest of my life, if I have to, but I'll do it sometime."

"I can't wait so long," von Ohlmhorst said. "The rest of my life will only be a few years, and when the *Schiaparelli* orbits in, I'll be going back to Terra on the *Cyrano*."

"I wish you wouldn't. This is a whole new world of archaeology. Literally."

"Yes." He finished the cocktail and looked at his pipe as though wondering whether to re-light it so soon before dinner, then put it in his pocket. "A whole new world—but I've grown old, and it isn't for me. I've spent my life studying the Hittites. I can speak the Hittite language, though maybe King Muwatallis wouldn't be able to understand my modern Turkish accent. But the things I'd have to learn, here—chemistry, physics, engineering, how to run analytic tests on steel girders and beryllium-silver alloys and plastics and silicones. I'm more at home with a civilization that rode in chariots and fought with swords and was just learning how to work iron. Mars is for young people. This expedition is a cadre of leadership—not only the Space Force people, who'll be the commanders of the main expedition, but us scientists, too. And I'm just an old cavalry general who can't learn to command tanks and

aircraft. You'll have time to learn about Mars. I won't."

His reputation as the dean of Hittitologists was solid and secure, too, she added mentally. Then she felt ashamed of the thought. He wasn't to be classed with Tony Lattimer.

"All I came for was to get the work started," he was continuing. "The Federation Government felt that an old hand should do that. Well, it's started, now; you and Tony and whoever come out on the *Schiaparelli* must carry it on. You said it, yourself; you have a whole new world. This is only one city, of the last Martian civilization. Behind this, you have the Late Upland Culture, and the Canal Builders, and all the civilizations and races and empires before them, clear back to the Martian Stone Age." He hesitated for a moment. "You have no idea what all you have to learn, Martha. This isn't the time to start specializing too narrowly."

They all got out of the truck and stretched their legs and looked up the road to the tall building with the queer conical cap askew on its top. The four little figures that had been busy against its wall climbed into the jeep and started back slowly, the smallest of them, Sachiko Koremitsu, paying out an electric cable behind. When it pulled up beside the truck, they climbed out; Sachiko attached the free end of the cable to a nuclear-electric battery. At once, dirty gray smoke and

orange dust puffed out from the wall of the building, and, a second later, the multiple explosion banged.

She and Tony Lattimer and Major Lindemann climbed onto the truck, leaving the jeep stand by the road. When they reached the building, a satisfyingly wide breach had been blown in the wall. Lattimer had placed his shots between two of the windows; they were both blown out along with the wall between, and lay unbroken on the ground. Martha remembered the first building they had entered. A Space Force officer had picked up a stone and thrown it at one of the windows, thinking that would be all they'd need to do. It had bounced back. He had drawn his pistol—they'd all carried guns, then, on the principle that what they didn't know about Mars might easily hurt them—and fired four shots. The bullets had ricocheted, screaming thinly; there were four coppery smears of jacket-metal on the window, and a little surface spalling. Somebody tried a rifle; the 4000-f.s. bullet had cracked the glasslike pane without penetrating. An oxyacetylene torch had taken an hour to cut the window out; the lab crew, aboard the ship, were still trying to find out just what the stuff was.

Tony Lattimer had gone forward and was sweeping his flashlight back and forth, swearing petulantly, his voice harshened and amplified by his helmet-speaker.

"I thought I was blasting into a

hallway; this lets us into a room. Careful; there's about a two-foot drop to the floor, and a lot of rubble from the blast just inside."

He stepped down through the breach; the others began dragging equipment out of the trucks—shovels and picks and crowbars and sledges, portable floodlights, cameras, sketching materials, an extension ladder, even Alpinists' ropes and crampons and pickaxes. Hubert Penrose was shouldering something that looked like a surrealist machine gun but which was really a nuclear-electric jack-hammer. Martha selected one of the spike-shod mountaineer's ice axes, with which she could dig or chop or poke or pry or help herself over rough footing.

The windows, grimed and crusted with fifty millennia of dust, filtered in a dim twilight; even the breach in the wall, in the morning shade, lighted only a small patch of floor. Somebody snapped on a floodlight, aiming it at the ceiling. The big room was empty and bare; dust lay thick on the floor and reddened the once-white walls. It could have been a large office, but there was nothing left in it to indicate its use.

"This one's been stripped up to the seventh floor!" Lattimer exclaimed. "Street level'll be cleaned out, completely."

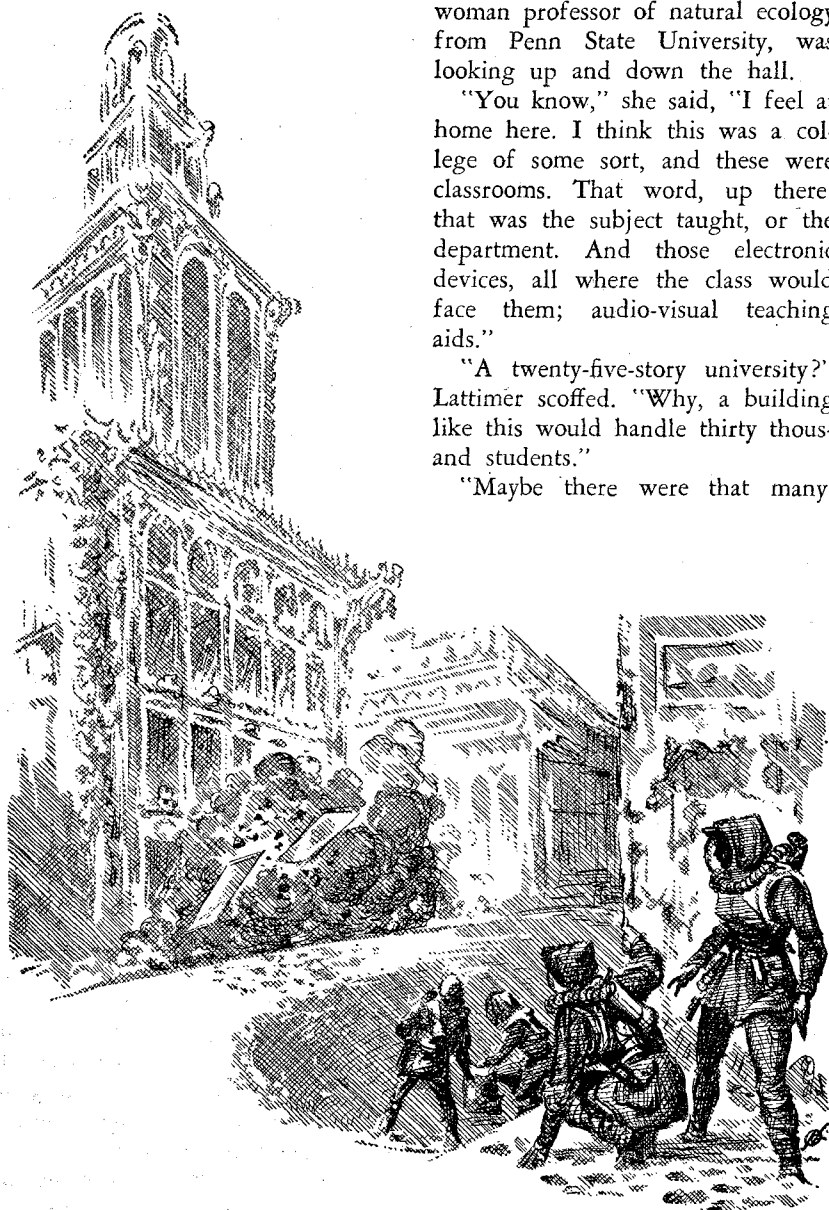
"Do for living quarters and shops, then," Lindemann said. "Added to the others, this'll take care of everybody on the *Schiaparelli*."

"Seem to have been a lot of elec-

tric or electronic apparatus over along this wall," one of the Space Force officers commented. "Ten or twelve electric outlets." He brushed the dusty wall with his glove, then scraped on the floor with his foot. "I can see where things were pried loose."

The door, one of the double sliding things the Martians had used, was closed. Selim von Ohlmhorst tried it, but it was stuck fast. The metal latch-parts had frozen together, molecule bonding itself to molecule, since the door had last been closed. Hubert Penrose came over with the jack-hammer, fitting a spear-point chisel into place. He set the chisel in the joint between the doors, braced the hammer against his hip, and squeezed the trigger-switch. The hammer banged briefly like the weapon it resembled, and the doors popped a few inches apart, then stuck. Enough dust had worked into the recesses into which it was supposed to slide to block it on both sides.

That was old stuff; they ran into that every time they had to force a door, and they were prepared for it. Somebody went outside and brought in a power-jack and finally one of the doors inched back to the door jamb. That was enough to get the lights and equipment through; they all passed from the room to the hallway beyond. About half the other doors were open; each had a number and a single word, *Darfbulva*, over it.



One of the civilian volunteers, a woman professor of natural ecology from Penn State University, was looking up and down the hall.

"You know," she said, "I feel at home here. I think this was a college of some sort, and these were classrooms. That word, up there; that was the subject taught, or the department. And those electronic devices, all where the class would face them; audio-visual teaching aids."

"A twenty-five-story university?" Lattimer scoffed. "Why, a building like this would handle thirty thousand students."

"Maybe there were that many."

This was a big city, in its prime," Martha said, moved chiefly by a desire to oppose Lattimer.

"Yes, but think of the snafu in the halls, every time they changed classes. It'd take half an hour to get everybody back and forth from one floor to another." He turned to von Ohlmhorst. "I'm going up above this floor. This place has been looted clean up to here, but there's a chance there may be something above," he said.

"I'll stay on this floor, at present," the Turco-German replied. "There will be much coming and going, and dragging things in and out. We should get this completely examined and recorded first. Then Major Lindemann's people can do their worst, here."

"Well, if nobody else wants it, I'll take the downstairs," Martha said.

"I'll go along with you," Hubert Penrose told her. "If the lower floors have no archaeological value, we'll turn them into living quarters. I like this building; it'll give everybody room to keep out from under everybody else's feet." He looked down the hall. "We ought to find escalators at the middle."

The hallway, too, was thick underfoot with dust. Most of the open rooms were empty, but a few contained furniture, including small seat-desks. The original proponent of the university theory pointed these out as just what might be found in classrooms. There were

escalators, up and down, on either side of the hall, and more on the intersecting passage to the right.

"That's how they handled the students, between classes," Martha commented. "And I'll bet there are more ahead, there."

They came to a stop where the hallway ended at a great square central hall. There were elevators, there, on two of the sides, and four escalators, still usable as stairways. But it was the walls, and the paintings on them, that brought them up short and staring.

They were clouded with dirt—she was trying to imagine what they must have looked like originally, and at the same time estimating the labor that would be involved in cleaning them—but they were still distinguishable, as was the word, *Darfbulva*, in golden letters above each of the four sides. It was a moment before she realized, from the murals, that she had at last found a meaningful Martian word. They were a vast historical panorama, clockwise around the room. A group of skin-clad savages squatting around a fire. Hunters with bows and spears, carrying the carcass of an animal slightly like a pig. Nomads riding long-legged, graceful mounts like hornless deer. Peasants sowing and reaping; mud-walled hut villages, and cities; processions of priests and warriors; battles with swords and bows, and with cannon and muskets; galleys, and ships with sails, and ships without visible means of propulsion, and aircraft.

Changing costumes and weapons and machines and styles of architecture. A richly fertile landscape, gradually merging into barren deserts and bushlands—the time of the great planet-wide drought. The Canal Builders—men with machines recognizable as steam-shovels and derricks, digging and quarrying and driving across the empty plains with aqueducts. More cities—seaports on the shrinking oceans; dwindling, half-deserted cities; an abandoned city, with four tiny humanoid figures and a thing like a combat-car in the middle of a brush-grown plaza, they and their vehicle dwarfed by the huge lifeless buildings around them. She had not the least doubt; *Darfbulva* was History.

"Wonderful!" von Ohlmhorst was saying. "The entire history of this race. Why, if the painter depicted appropriate costumes and weapons and machines for each period, and got the architecture right, we can break the history of this planet into eras and periods and civilizations."

"You can assume they're authentic. The faculty of this university would insist on authenticity in the *Darfbulva* — History — Department," she said.

"Yes! *Darfbulva*—History! And your magazine was a journal of *Sornbulva*!" Penrose exclaimed. "You have a word, Martha!" It took her an instant to realize that he had called her by her first name, and not Dr. Dane. She wasn't sure if that weren't a bigger triumph than learn-

ing a word of the Martian language. Or a more auspicious start. "Alone, I suppose that *bulva* means something like science or knowledge, or study; combined, it would be equivalent to our 'ology. And *darf* would mean something like past, or old times, or human events, or chronicles."

"That gives you three words, Martha!" Sachiko jubilated. "You did it."

"Let's don't go too fast," Lattimer said, for once not derisively. "I'll admit that *darfbulva* is the Martian word for history as a subject of study; I'll admit that *bulva* is the general word and *darf* modifies it and tells us which subject is meant. But as for assigning specific meanings, we can't do that because we don't know just how the Martians thought, scientifically or otherwise."

He stopped short, startled by the blue-white light that blazed as Sid Chamberlain's Kliegettes went on. When the whirring of the camera stopped, it was Chamberlain who was speaking:

"This is the biggest thing yet; the whole history of Mars, stone age to the end, all on four walls. I'm taking this with the fast shutter, but we'll telecast it in slow motion, from the beginning to the end. Tony, I want you to do the voice for it—running commentary, interpretation of each scene as it's shown. Would you do that?"

Would he do that! Martha thought. If he had a tail, he'd be wagging it at the very thought.

"Well, there ought to be more murals on the other floors," she said. "Who wants to come downstairs with us?"

Sachiko did; immediately, Ivan Fitzgerald volunteered. Sid decided to go upstairs with Tony Lattimer, and Gloria Standish decided to go upstairs, too. Most of the party would remain on the seventh floor, to help Selim von Ohlmhorst get it finished. After poking tentatively at the escalator with the spike of her ice axe, Martha led the way downward.

The sixth floor was *Darfbulva*, too; military and technological history, from the character of the murals. They looked around the central hall, and went down to the fifth; it was like the floors above except that the big quadrangle was stacked with dusty furniture and boxes. Ivan Fitzgerald, who was carrying the floodlight, swung it slowly around. Here the murals were of heroic-sized Martians, so human in appearance as to seem members of her own race, each holding some object—a book, or a testtube, or some bit of scientific apparatus, and behind them were scenes of laboratories and factories, flame and smoke, lightning-flashes. The word at the top of each of the four walls was one with which she was already familiar—*Sornbulva*.

"Hey, Martha; there's that word." Ivan Fitzgerald exclaimed. "The one in the title of your magazine." He

looked at the paintings. "Chemistry, or physics."

"Both," Hubert Penrose considered. "I don't think the Martians made any sharp distinction between them. See, the old fellow with the scraggly whiskers must be the inventor of the spectroscope; he has one in his hands, and he has a rainbow behind him. And the woman in the blue smock, beside him, worked in organic chemistry; see the diagrams of long-chain molecules behind her. What word would convey the idea of chemistry and physics taken as one subject?"

"*Sornbulva*," Sachiko suggested. "If *bulva*'s something like science, *sorn* must mean matter, or substance, or physical object. You were right, all along, Martha. A civilization like this would certainly leave something like this, that would be self-explanatory."

"This'll wipe a little more of that superior grin off Tony Lattimer's face," Fitzgerald was saying, as they went down the motionless escalator to the floor below. "Tony wants to be a big shot. When you want to be a big shot, you can't bear the possibility of anybody else being a bigger big shot, and whoever makes a start on reading this language will be the biggest big shot archaeology ever saw."

That was true. She hadn't thought of it, in that way, before, and now she tried not to think about it. She didn't want to be a big shot. She wanted to be able to read the Mar-

tian language, and find things out about the Martians.

Two escalators down, they came out on a mezzanine around a wide central hall on the street level, the floor forty feet below them and the ceiling thirty feet above. Their lights picked out object after object below—a huge group of sculptured figures in the middle; some kind of a motor vehicle jacked up on trestles for repairs; things that looked like machine-guns and auto-cannon; long tables, tops littered with a dust-covered miscellany; machinery; boxes and crates and containers.

They made their way down and walked among the clutter, missing a hundred things for every one they saw, until they found an escalator to the basement. There were three basements, one under another, until at last they stood at the bottom of the last escalator, on a bare concrete floor, swinging the portable flood-light over stacks of boxes and barrels and drums, and heaps of powdery dust. The boxes were plastic—nobody had ever found anything made of wood in the city—and the barrels and drums were of metal or glass or some glasslike substance. They were outwardly intact. The powdery heaps might have been anything organic, or anything containing fluid. Down here, where wind and dust could not reach, evaporation had been the only force of destruction after the minute life that caused putrefaction had vanished.

They found refrigeration rooms, too, and using Martha's ice axe and the pistollike vibratool Sachiko carried on her belt, they pounded and pried one open, to find dessicated piles of what had been vegetables, and leathery chunks of meat. Samples of that stuff, rocketed up to the ship, would give a reliable estimate, by radio-carbon dating, of how long ago this building had been occupied. The refrigeration unit, radically different from anything their own culture had produced, had been electrically powered. Sachiko and Penrose, poking into it, found the switches still on; the machine had only ceased to function when the power-source, whatever that had been, had failed.

The middle basement had also been used, at least toward the end, for storage; it was cut in half by a partition pierced by but one door. They took half an hour to force this, and were on the point of sending above for heavy equipment when it yielded enough for them to squeeze through. Fitzgerald, in the lead with the light, stopped short, looked around, and then gave a groan that came through his helmet-speaker like a foghorn.

"Oh, no! No!"

"What's the matter, Ivan?" Sachiko, entering behind him, asked anxiously.

He stepped aside. "Look at it, Sachi! Are we going to have to do all that?"

Martha crowded through behind her friend and looked around, then

stood motionless, dizzy with excitement. Books. Case on case of books, half an acre of cases, fifteen feet to the ceiling. Fitzgerald, and Penrose, who had pushed in behind her, were talking in rapid excitement; she only heard the sound of their voices, not their words. This must be the main stacks of the university library—the entire literature of the vanished race of Mars. In the center, down an aisle between the cases, she could see the hollow square of the librarians' desk, and stairs and a dumb-waiter to the floor above.

She realized that she was walking forward, with the others, toward this. Sachiko was saying: "I'm the lightest; let me go first." She must be talking about the spidery metal stairs.

"I'd say they were safe," Penrose answered. "The trouble we've had with doors around here shows that the metal hasn't deteriorated."

In the end, the Japanese girl led the way, more catlike than ever in her caution. The stairs were quite sound, in spite of their fragile appearance, and they all followed her. The floor above was a duplicate of the room they had entered, and seemed to contain about as many books. Rather than waste time forcing the door here, they returned to the middle basement and came up by the escalator down which they had originally descended.

The upper basement contained kitchens—electric stoves, some with pots and pans still on them—and a big room that must have been, origi-

nally, the students' dining room, though when last used it had been a workshop. As they expected, the library reading room was on the street-level floor, directly above the stacks. It seemed to have been converted into a sort of common living room for the building's last occupants. An adjoining auditorium had been made into a chemical works; there were vats and distillation apparatus, and a metal fractionating tower that extended through a hole knocked in the ceiling seventy feet above. A good deal of plastic furniture of the sort they had been finding everywhere in the city was stacked about, some of it broken up, apparently for reprocessing. The other rooms on the street floor seemed also to have been devoted to manufacturing and repair work; a considerable industry, along a number of lines, must have been carried on here for a long time after the university had ceased to function as such.

On the second floor, they found a museum; many of the exhibits remained, tantalizingly half-visible in grimed glass cases. There had been administrative offices there, too. The doors of most of them were closed, and they did not waste time trying to force them, but those that were open had been turned into living quarters. They made notes, and rough floor-plans, to guide them in future more thorough examination; it was almost noon before they had worked their way back to the seventh floor.

Selim von Ohlmhorst was in a room on the north side of the building, sketching the position of things before examining them and collecting them for removal. He had the floor checkerboarded with a grid of chalked lines, each numbered.

"We have everything on this floor photographed," he said. "I have three gangs—all the floodlights I have—sketching and making measurements. At the rate we're going, with time out for lunch, we'll be finished by the middle of the afternoon."

"You've been working fast. Evidently you aren't being high-church about a 'qualified archaeologist' entering rooms first," Penrose commented.

"Ach, childishness!" the old man exclaimed impatiently. "These officers of yours aren't fools. All of them have been to Intelligence School and Criminal Investigation School. Some of the most careful amateur archaeologists I ever knew were retired soldiers or policemen. But there isn't much work to be done. Most of the rooms are either empty or like this one—a few bits of furniture and broken trash and scraps of paper. Did you find anything down on the lower floors?"

"Well, yes," Penrose said, a hint of mirth in his voice. "What would you say, Martha?"

She started to tell Selim. The others, unable to restrain their excitement, broke in with interruptions. Von Ohlmhorst was staring in incredulous amazement.

"But this floor was looted almost clean, and the buildings we've entered before were all looted from the street level up," he said, at length.

"The people who looted this one lived here," Penrose replied. "They had electric power to the last; we found refrigerators full of food, and stoves with the dinner still on them. They must have used the elevators to haul things down from the upper floor. The whole first floor was converted into workshops and laboratories. I think that this place must have been something like a monastery in the Dark Ages in Europe, or what such a monastery would have been like if the Dark Ages had followed the fall of a highly developed scientific civilization. For one thing, we found a lot of machine guns and light auto-cannon on the street level, and all the doors were barricaded. The people here were trying to keep a civilization running after the rest of the planet had gone back to barbarism; I suppose they'd have to fight off raids by the barbarians now and then."

"You're not going to insist on making this building into expedition quarters, I hope, colonel?" von Ohlmhorst asked anxiously.

"Oh, no! This place is an archaeological treasure-house. More than that; from what I saw, our technicians can learn a lot, here. But you'd better get this floor cleaned up as soon as you can, though. I'll have the subsurface part, from the sixth floor down, airsealed. Then we'll

put in oxygen generators and power units, and get a couple of elevators into service. For the floors above, we can use temporary airsealing floor by floor, and portable equipment; when we have things atmosphered and lighted and heated, you and Martha and Tony Lattimer can go to work systematically and in comfort, and I'll give you all the help I can spare from the other work. This is one of the biggest things we've found yet."

Tony Lattimer and his companions came down to the seventh floor a little later.

"I don't get this, at all," he began, as soon as he joined them. "This building wasn't stripped the way the others were. Always, the procedure seems to have been to strip from the bottom up, but they seem to have stripped the top floors first, here. All but the very top. I found out what that conical thing is, by the way. It's a wind-rotor, and under it there's an electric generator. This building generated its own power."

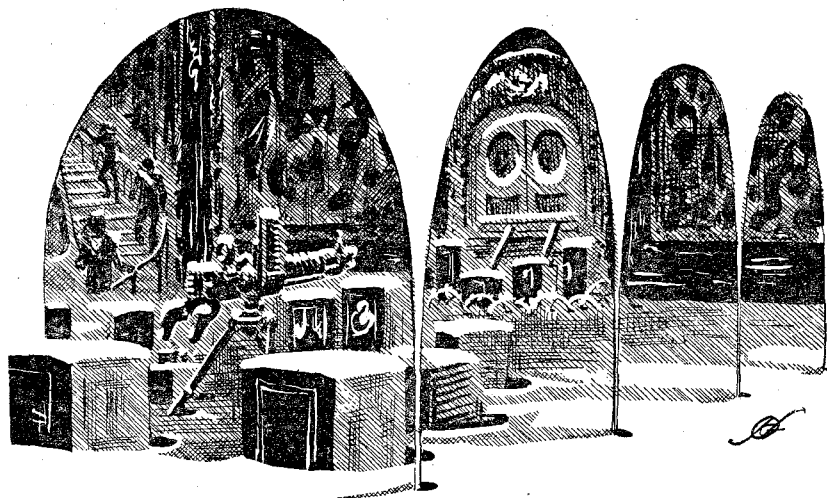
"What sort of condition are the generators in?" Penrose asked.

"Well, everything's full of dust that blew in under the rotor, of course, but it looks to be in pretty good shape. Hey, I'll bet that's it! They had power, so they used the elevators to haul stuff down. That's just what they did. Some of the floors above here don't seem to have been touched, though." He paused momentarily; back of his oxy-mask, he seemed to be grinning. "I don't know that I ought to mention this

in front of Martha, but two floors above we hit a room—it must have been the reference library for one of the departments—that had close to five hundred books in it."

The noise that interrupted him, like the squawking of a Brobdingnagian parrot, was only Ivan Fitzgerald laughing through his helmet-speaker.

Lunch at the huts was a hasty meal, with a gabble of full-mouthed and excited talking. Hubert Penrose and his chief subordinates snatched their food in a huddled consultation at one end of the table; in the afternoon, work was suspended on everything else and the fifty-odd men and women of the expedition concentrated their efforts on the University. By the middle of the afternoon, the seventh floor had been completely examined, photographed and sketched, and the murals in the square central hall covered with protective tarpaulins, and Laurent Gicquel and his airsealing crew had moved in and were at work. It had been decided to seal the central hall at the entrances. It took the French-Canadian engineer most of the afternoon to find all the ventilation-ducts and plug them. An elevator-shaft on the north side was found reaching clear to the twenty-fifth floor; this would give access to the top of the building; another shaft, from the center, would take care of the floors below. Nobody seemed willing to trust the ancient elevators, themselves; it was the next evening before a couple of



cars and the necessary machinery could be fabricated in the machine shops aboard the ship and sent down by landing-rocket. By that time, the airsealing was finished, the nuclear-electric energy-converters were in place, and the oxygen generators set up.

Martha was in the lower basement, an hour or so before lunch the day after, when a couple of Space Force officers came out of the elevator, bringing extra lights with them. She was still using oxygen-equipment; it was a moment before she realized that the newcomers had no masks, and that one of them was smoking. She took off her own helmet-speaker, throat-mike and mask and unslung her tank-pack, breathing cautiously. The air was chilly, and musty-acrid with the odor of antiquity—the first Martian odor

she had smelled—but when she lit a cigarette, the lighter flamed clear and steady and the tobacco caught and burned evenly.

The archaeologists, many of the other civilian scientists, a few of the Space Force officers and the two news-correspondents, Sid Chamberlain and Gloria Standish, moved in that evening, setting up cots in vacant rooms. They installed electric stoves and a refrigerator in the old Library Reading Room, and put in a bar and lunch counter. For a few days, the place was full of noise and activity, then, gradually, the Space Force people and all but a few of the civilians returned to their own work. There was still the business of airsealing the more habitable of the buildings already explored, and fitting them up in readiness for the arrival, in a year and a half, of the

five hundred members of the main expedition. There was work to be done enlarging the landing field for the ship's rocket craft, and building new chemical-fuel tanks.

There was the work of getting the city's ancient reservoirs cleared of silt before the next spring thaw brought more water down the underground aquaducts everybody called canals in mistranslation of Schiaparelli's Italian word, though this was proving considerably easier than anticipated. The ancient Canal-Builders must have anticipated a time when their descendants would no longer be capable of maintenance work, and had prepared against it. By the day after the University had been made completely habitable, the actual work there was being done by Selim, Tony Lattimer and herself, with half a dozen Space Force officers, mostly girls, and four or five civilians, helping.

They worked up from the bottom, dividing the floor-surfaces into numbered squares, measuring and listing and sketching and photographing. They packaged samples of organic matter and sent them up to the ship for Carbon-14 dating and analysis; they opened cans and jars and bottles, and found that everything fluid in them had evaporated, through the porosity of glass and metal and plastic if there were no other way. Wherever they looked, they found evidence of activity suddenly suspended and never resumed. A vise with a bar of metal in it,

half cut through and the hacksaw beside it. Pots and pans with hardened remains of food in them; a leathery cut of meat on a table, with the knife ready at hand. Toilet articles on washstands; unmade beds, the bedding ready to crumble at a touch but still retaining the impress of the sleeper's body; papers and writing materials on desks, as though the writer had gotten up, meaning to return and finish in a fifty-thousand-year-ago moment.

It worried her. Irrationally, she began to feel that the Martians had never left this place; that they were still around her, watching disapprovingly every time she picked up something they had laid down. They haunted her dreams, now, instead of their enigmatic writing. At first, everybody who had moved into the University had taken a separate room, happy to escape the crowding and lack of privacy of the huts. After a few nights, she was glad when Gloria Standish moved in with her, and accepted the newswoman's excuse that she felt lonely without somebody to talk to before falling asleep. Sachiko Koremitsu joined them the next evening, and before going to bed, the girl officer cleaned and oiled her pistol, remarking that she was afraid some rust may have gotten into it.

The others felt it, too. Selim von Ohlmhorst developed the habit of turning quickly and looking behind him, as though trying to surprise somebody or something that was stalking him. Tony Lattimer, having

a. drink at the bar that had been improvised from the librarian's desk in the Reading Room, set down his glass and swore.

"You know what this place is? It's an archaeological *Marie Celeste*!" he declared. "It was occupied right up to the end—we've all seen the shifts these people used to keep a civilization going here—but what was the end? What happened to them? Where did they go?"

"You didn't expect them to be waiting out front, with a red carpet and a big banner, *Welcome Terrans*, did you, Tony?" Gloria Standish asked.

"No, of course not; they've all been dead for fifty thousand years. But if they were the last of the Martians, why haven't we found their bones, at least? Who buried them, after they were dead?" He looked at the glass, a bubble-thin goblet, found, with hundreds of others like it, in a closet above, as though debating with himself whether to have another drink. Then he voted in the affirmative and reached for the cocktail pitcher. "And every door on the old ground level is either barred or barricaded from the inside. How did they get out? And why did they leave?"

The next day, at lunch, Sachiko Koremitsu had the answer to the second question. Four or five electrical engineers had come down by rocket from the ship, and she had been spending the morning with

them, in oxy-masks, at the top of the building.

"Tony, I thought you said those generators were in good shape," she began, catching sight of Lattimer. "They aren't. They're in the most unholy mess I ever saw. What happened, up there, was that the supports of the wind-rotor gave way, and weight snapped the main shaft, and smashed everything under it."

"Well, after fifty thousand years, you can expect something like that," Lattimer retorted. "When an archaeologist says something's in good shape, he doesn't necessarily mean it'll start as soon as you shove a switch in."

"You didn't notice that it happened when the power was on, did you," one of the engineers asked, nettled at Lattimer's tone. "Well, it was. Everything's burned out or shorted or fused together; I saw one busbar eight inches across melted clean in two. It's a pity we didn't find things in good shape, even archaeologically speaking. I saw a lot of interesting things, things in advance of what we're using now. But it'll take a couple of years to get everything sorted out and figure what it looked like originally."

"Did it look as though anybody'd made any attempt to fix it?" Martha asked.

Sachiko shook her head. "They must have taken one look at it and given up. I don't believe there would have been any possible way to repair anything."

"Well, that explains why they left.

They needed electricity for lighting, and heating, and all their industrial equipment was electrical. They had a good life, here, with power; without it, this place wouldn't have been habitable."

"Then why did they barricade everything from the inside, and how did they get out?" Lattimer wanted to know.

"To keep other people from breaking in and looting. Last man out probably barred the last door and slid down a rope from upstairs," von Ohlmhorst suggested. "This Houdini-trick doesn't worry me too much. We'll find out eventually."

"Yes, about the time Martha starts reading Martian," Lattimer scoffed.

"That may be just when we'll find out," von Ohlmhorst replied seriously. "It wouldn't surprise me if they left something in writing when they evacuated this place."

"Are you really beginning to treat this pipe dream of hers as a serious possibility, Selim?" Lattimer demanded. "I know, it would be a wonderful thing, but wonderful things don't happen just because they're wonderful. Only because they're possible, and this isn't. Let me quote that distinguished Hittitologist, Johannes Friedrich: 'Nothing can be translated out of nothing.' Or that later but not less distinguished Hittitologist, Selim von Ohlmhorst: 'Where are you going to get your bilingual?'"

"Friedrich lived to see the Hittite language deciphered and read," von Ohlmhorst reminded him.

"Yes, when they found Hittite-Assyrian bilinguals." Lattimer measured a spoonful of coffee-powder into his cup and added hot water. "Martha, you ought to know, better than anybody, how little chance you have. You've been working for years in the Indus Valley; how many words of Harappa have you or anybody else ever been able to read?"

"We never found a university, with a half-million-volume library, at Harappa or Mohenjo-Daro."

"And, the first day we entered this building, we established meanings for several words," Selim von Ohlmhorst added.

"And you've never found another meaningful word since," Lattimer added. And you're only sure of general meaning, not specific meaning of word-elements, and you have a dozen different interpretations for each word."

"We made a start," von Ohlmhorst maintained. "We have Grotefend's word for 'king.' But I'm going to be able to read some of those books, over there, if it takes me the rest of my life here. It probably will, anyhow."

"You mean you've changed your mind about going home on the *Cyrano*?" Martha asked. "You'll stay on here?"

The old man nodded. "I can't leave this. There's too much to discover. The old dog will have to learn a lot of new tricks, but this is where my work will be, from now on."

Lattimer was shocked. "You're

nuts!" he cried. "You mean you're going to throw away everything you've accomplished in Hittitology and start all over again here on Mars? Martha, if you've talked him into this crazy decision, you're a criminal!"

"Nobody talked me into anything," von Ohlmhorst said roughly. "And as for throwing away what I've accomplished in Hittitology, I don't know what the devil you're talking about. Everything I know about the Hittite Empire is published and available to anybody. Hittitology's like Egyptology; it's stopped being research and archaeology and become scholarship and history. And I'm not a scholar or a historian; I'm a pick-and-shovel field archaeologist—a highly skilled and specialized grave-robber and junk-picker—and there's more pick-and-shovel work on this planet than I could do in a hundred lifetimes. This is something new; I was a fool to think I could turn my back on it and go back to scribbling footnotes about Hittite kings."

"You could have anything you wanted, in Hittitology. There are a dozen universities that'd sooner have you than a winning football team. But no! You have to be the top man in Martiology, too. You can't leave that for anybody else—" Lattimer shoved his chair back and got to his feet, leaving the table with an oath that was almost a sob of exasperation.

Maybe his feelings were too much for him. Maybe he realized, as

Martha did, what he had betrayed. She sat, avoiding the eyes of the others, looking at the ceiling, as embarrassed as though Lattimer had flung something dirty on the table in front of them. Tony Lattimer had, desperately, wanted Selim to go home on the *Cyrano*. Martiology was a new field; if Selim entered it, he would bring with him the reputation he had already built in Hittitology, automatically stepping into the leading role that Lattimer had coveted for himself. Ivan Fitzgerald's words echoed back to her—when you want to be a big shot, you can't bear the possibility of anybody else being a bigger big shot. His derision of her own efforts became comprehensible, too. It wasn't that he was convinced that she would never learn to read the Martian language. He had been afraid that she would.

Ivan Fitzgerald finally isolated the germ that had caused the Finchly girl's undiagnosed illness. Shortly afterward, the malady turned into a mild fever, from which she recovered. Nobody else seemed to have caught it. Fitzgerald was still trying to find out how the germ had been transmitted.

They found a globe of Mars, made when the city had been a seaport. They located the city, and learned that its name had been Kukan—or something with a similar vowel-consonant ratio. Immediately, Sid Chamberlain and Gloria Standish began giving their telecasts a Kukan dateline, and Hubert Penrose used

the name in his official reports. They also found a Martian calendar; the year had been divided into ten more or less equal months, and one of them had been Doma. Another month was Nor, and that was a part of the name of the scientific journal Martha had found.

Bill Chandler, the zoologist, had been going deeper and deeper into the old sea bottom of Syrtis. Four hundred miles from Kukan, and at fifteen thousand feet lower altitude, he shot a bird. At least, it was a something with wings and what were almost but not quite feathers, though it was more reptilian than avian in general characteristics. He and Ivan Fitzgerald skinned and mounted it, and then dissected the carcass almost tissue by tissue. About seven-eighths of its body capacity was lungs; it certainly breathed air containing at least half enough oxygen to support human life, or five times as much as the air around Kukan.

That took the center of interest away from archaeology, and started a new burst of activity. All the expedition's aircraft—four jetticopters and three wingless airdyne reconnaissance fighters—were thrown into intensified exploration of the lower sea bottoms, and the bio-science boys and girls were wild with excitement and making new discoveries on each flight.

The University was left to Selim and Martha and Tony Lattimer, the latter keeping to himself while she and the old Turco-German worked together. The civilian specialists in

other fields, and the Space Force people who had been holding tape lines and making sketches and snapping cameras, were all flying to lower Syrtis to find out how much oxygen there was and what kind of life it supported.

Sometimes Sachiko dropped in; most of the time she was busy helping Ivan Fitzgerald dissect specimens. They had four or five species of what might loosely be called birds, and something that could easily be classed as a reptile, and a carnivorous mammal the size of a cat with bird-like claws, and a herbivore almost identical with the piglike thing in the big *Darfbulva* mural, and another like a gazelle with a single horn in the middle of its forehead.

The high point came when one party, at thirty thousand feet below the level of Kukan, found breathable air. One of them had a mild attack of *sorroche* and had to be flown back for treatment in a hurry, but the others showed no ill effects.

The daily newscasts from Terra showed a corresponding shift in interest at home. The discovery of the University had focused attention on the dead past of Mars; now the public was interested in Mars as a possible home for humanity. It was Tony Lattimer who brought archaeology back into the activities of the expedition and the news at home.

Martha and Selim were working in the museum on the second floor, scrubbing the grime from the glass cases, noting contents, and grease-penciling numbers; Lattimer and a

couple of Space Force officers were going through what had been the administrative offices on the other side. It was one of these, a young second lieutenant, who came hurrying in from the mezzanine, almost bursting with excitement.

"Hey, Martha! Dr. von Ohlmhorst!" he was shouting. "Where are you? Tony's found the Martians!"

Selim dropped his rag back in the bucket; she laid her clipboard on top of the case beside her.

"Where?" they asked together.

"Over on the north side." The lieutenant took hold of himself and spoke more deliberately. "Little room, back of one of the old faculty offices—conference room. It was locked from the inside, and we had to burn it down with a torch. That's where they are. Eighteen of them, around a long table—"

Gloria Standish, who had dropped in for lunch, was on the mezzanine, fairly screaming into a radio-phone extension:

"... Dozen and a half of them! Well, of course they're dead. What a question! They look like skeletons covered with leather. No, I do not know what they died of. Well, forget it; I don't care if Bill Chandler's found a three-headed hippopotamus. Sid, don't you get it? We've found the *Martians*!"

She slammed the phone back on its hook, rushing away ahead of them.

Martha remembered the closed

door; on the first survey, they hadn't attempted opening it. Now it was burned away at both sides and lay, still hot along the edges, on the floor of the big office room in front. A floodlight was on in the room inside, and Lattimer was going around looking at things while a Space Force officer stood by the door. The center of the room was filled by a long table; in armchairs around it sat the eighteen men and women who had occupied the room for the last fifty millennia. There were bottles and glasses on the table in front of them, and, had she seen them in a dimmer light, she would have thought that they were merely dozing over their drinks. One had a knee hooked over his chair-arm and was curled in foetus-like sleep. Another had fallen forward onto the table, arms extended, the emerald set of a ring twinkling dully on one finger. Skeletons covered with leather, Gloria Standish had called them, and so they were—faces like skulls, arms and legs like sticks, the flesh shrunken onto the bones under it.

"Isn't this something!" Lattimer was exulting. "Mass suicide, that's what it was. Notice what's in the corners?"

Braziers, made of perforated two-gallon-odd metal cans, the white walls smudged with smoke above them. Von Ohlmhorst had noticed them at once, and was poking into one of them with his flashlight.

"Yes; charcoal. I noticed a quantity of it around a couple of hand-

forges in the shop on the first floor. That's why you had so much trouble breaking in; they'd sealed the room on the inside." He straightened and went around the room, until he found a ventilator, and peered into it. "Stuffed with rags. They must have been all that were left, here. Their power was gone, and they were old and tired, and all around them their world was dying. So they just came in here and lit the charcoal, and sat drinking together till they all fell asleep. Well, we know what became of them, now, anyhow."

Sid and Gloria made the most of it. The Terran public wanted to hear about Martians, and if live Martians couldn't be found, a room full of dead ones was the next best thing. Maybe an even better thing; it had been only sixty-odd years since the Orson Welles invasion-scare. Tony Lattimer, the discoverer, was beginning to cash in on his attentions to Gloria and his ingratiating with Sid; he was always either making voice-and-image talks for telecast or listening to the news from the home planet. Without question, he had become, overnight, the most widely known archaeologist in history.

"Not that I'm interested in all this, for myself," he disclaimed, after listening to the telecast from Terra two days after his discovery. "But this is going to be a big thing for Martian archaeology. Bring it to the public attention; dramatize it. Selim, can you remember when Lord

Carnarvon and Howard Carter found the tomb of Tutankhamen?"

"In 1923? I was two years old, then," von Ohlmhorst chuckled. "I really don't know how much that publicity ever did for Egyptiology. Oh, the museums did devote more space to Egyptian exhibits, and after a museum department head gets a few extra showcases, you know how hard it is to make him give them up. And, for a while, it was easier to get financial support for new excavations. But I don't know how much good all this public excitement really does, in the long run."

"Well, I think one of us should go back on the *Cyrano*, when the *Schiaparelli* orbits in," Lattimer said. "I'd hoped it would be you; your voice would carry the most weight. But I think it's important that one of us go back, to present the story of our work, and what we have accomplished and what we hope to accomplish, to the public and to the universities and the learned societies, and to the Federation Government. There will be a great deal of work that will have to be done. We must not allow the other scientific fields and the so-called practical interests to monopolize public and academic support. So, I believe I shall go back at least for a while, and see what I can do—"

Lectures. The organization of a Society of Martian Archaeology, with Anthony Lattimer, Ph.D., the logical candidate for the chair. Degrees, honors; the deference of the learned, and the adulation of the

lay public. Positions, with impressive titles and salaries. Sweet are the uses of publicity.

She crushed out her cigarette and got to her feet. "Well, I still have the final lists of what we found in *Halvbulva*—Biology—department to check over. I'm starting on *Sornhulva* tomorrow, and I want that stuff in shape for expert evaluation."

That was the sort of thing Tony Lattimer wanted to get away from, the detail-work and the drudgery. Let the infantry do the slogging through the mud; the brass-hats got the medals.

She was halfway through the fifth floor, a week later, and was having midday lunch in the reading room on the first floor when Hubert Penrose came over and sat down beside her, asking her what she was doing. She told him.

"I wonder if you could find me a couple of men, for an hour or so," she added. "I'm stopped by a couple of jammed doors at the central hall. Lecture room and library, if the layout of that floor's anything like the ones below it."

"Yes. I'm a pretty fair door-buster, myself." He looked around the room. "There's Jeff Miles; he isn't doing much of anything. And we'll put Sid Chamberlain to work, for a change, too. The four of us ought to get your doors open." He called to Chamberlain, who was carrying his tray over to the dish washer. "Oh, Sid; you doing anything for the next hour or so?"

"I was going up to the fourth floor, to see what Tony's doing."

"Forget it. Tony's bagged his season limit of Martians. I'm going to help Martha bust in a couple of doors; we'll probably find a whole cemetery full of Martians."

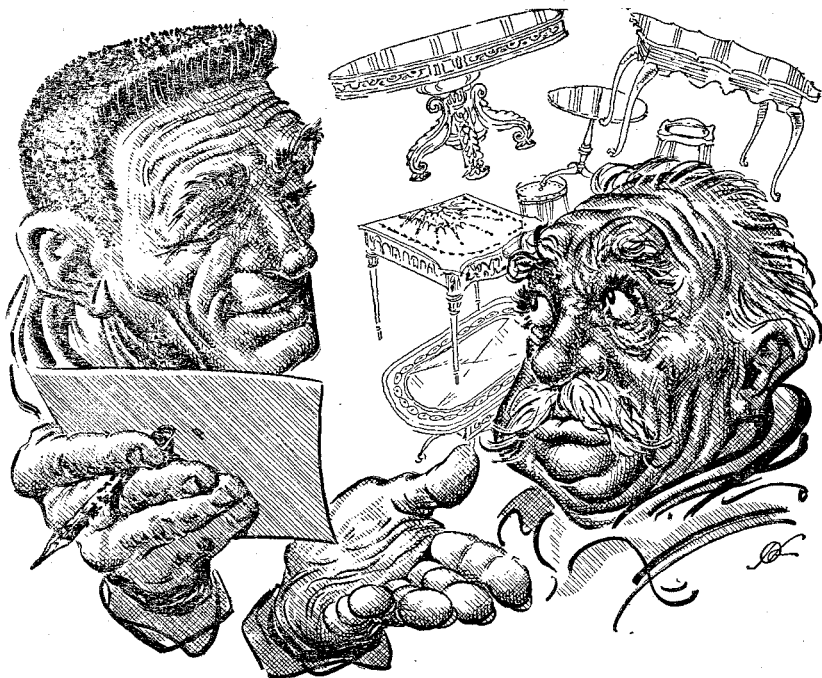
Chamberlain shrugged. "Why not. A jammed door can have anything back of it, and I know what Tony's doing—just routine stuff."

Jeff Miles, the Space Force captain, came over, accompanied by one of the lab-crew from the ship who had come down on the rocket the day before.

"This ought to be up your alley, Mort," he was saying to his companion. "Chemistry and physics department. Want to come along?"

The lab man, Mort Tranter, was willing. Seeing the sights was what he'd come down from the ship for. She finished her coffee and cigarette, and they went out into the hall together, gathered equipment and rode the elevator to the fifth floor.

The lecture hall door was the nearest; they attacked it first. With proper equipment and help, it was no problem and in ten minutes they had it open wide enough to squeeze through with the floodlights. The room inside was quite empty, and, like most of the rooms behind closed doors, comparatively free from dust. The students, it appeared, had sat with their backs to the door, facing a low platform, but their seats and the lecturer's table and equipment had been removed. The two side walls bore inscriptions: on the



right, a pattern of concentric circles which she recognized as a diagram of atomic structure, and on the left a complicated table of numbers and words, in two columns. Tranter was pointing at the diagram on the right.

"They got as far as the Bohr atom, anyhow," he said. "Well, not quite. They knew about electron shells, but they have the nucleus pictured as a solid mass. No indication of proton-and-neutron structure. I'll bet, when you come to translate their scientific books, you'll find that they taught that the atom was the ultimate and indivisible particle.

That explains why you people never found any evidence that the Martians used nuclear energy."

"That's a uranium atom," Captain Miles mentioned.

"It is?" Sid Chamberlain asked, excitedly. "Then they did know about atomic energy. Just because we haven't found any pictures of A-bomb mushrooms doesn't mean—"

She turned to look at the other wall. Sid's signal reactions were getting away from him again; uranium meant nuclear power to him, and the two words were interchangeable. As she studied the arrangement of

the numbers and words, she could hear Tranter saying:

"Nuts, Sid. We knew about uranium a long time before anybody found out what could be done with it. Uranium was discovered on Terra in 1789, by Klaproth."

There was something familiar about the table on the left wall. She tried to remember what she had been taught in school about physics, and what she had picked up by accident afterward. The second column was a continuation of the first: there were forty-six items in each, each item numbered consecutively—

"Probably used uranium because it's the largest of the natural atoms," Penrose was saying. "The fact that there's nothing beyond it there shows that they hadn't created any of the transuranics. A student could go to that thing and point out the outer electron of any of the ninety-two elements."

Ninety-two! That was it; there were ninety-two items in the table on the left wall! Hydrogen was Number One, she knew; One, *Sarfaldsorn*. Helium was Two; that was *Tirfalddasorn*. She couldn't remember which element came next, but in Martian it was *Sarfalddavas*. *Sorn* must mean matter, or substance, then. And *davas*; she was trying to think of what it could be. She turned quickly to the others, catching hold of Hubert Penrose's arm with one hand and waving her clipboard with the other.

"Look at this thing, over here,"

she was clamoring excitedly. "Tell me what you think it is. Could it be a table of the elements?"

They all turned to look. Mort Tranter stared at it for a moment.

"Could be. If I only knew what those squiggles meant—"

That was right; he'd spent his time aboard the ship.

"If you could read the numbers, would that help?" she asked, beginning to set down the Arabic digits and their Martian equivalents. "It's decimal system, the same as we use."

"Sure. If that's a table of elements, all I'd need would be the numbers. Thanks," he added as she tore off the sheet and gave it to him.

Penrose knew the numbers, and was ahead of him. "Ninety-two items, numbered consecutively. The first number would be the atomic number. Then a single word, the name of the element. Then the atomic weight—"

She began reading off the names of the elements. "I know hydrogen and helium; what's *tirfalddavas*, the third one?"

"Lithium," Tranter said. "The atomic weights aren't run out past the decimal point. Hydrogen's one plus, if that double-hook dingus is a plus sign; Helium's four-plus, that's right. And lithium's given as seven, that isn't right. It's six-point nine-four-oh. Or is that thing a Martian minus sign?"

"Of course! Look! A plus sign is a hook, to hang things together;

a minus sign is a knife, to cut something off from something—see, the little loop is the handle and the long pointed loop is the blade. Stylized, of course, but that's what it is. And the fourth element, *kira-davas*; what's that?"

"Beryllium. Atomic weight given as nine-and-a-hook; actually it's nine-point-oh-two."

Sid Chamberlain had been disgruntled because he couldn't get a story about the Martians having developed atomic energy. It took him a few minutes to understand the newest development, but finally it dawned on him.

"Hey! You're reading that!" he cried. "You're reading Martian!"

"That's right," Penrose told him. "Just reading it right off. I don't get the two items after the atomic weight, though. They look like months of the Martian calendar. What ought they to be, Mort?"

Tranter hesitated. "Well, the next information after the atomic weight ought to be the period and group numbers. But those are words."

"What would the numbers be for the first one, hydrogen?"

"Period One, Group One. One electron shell, one electron in the outer shell," Tranter told her. "Helium's period one, too, but it has the outer—only—electron shell full, so it's in the group of inert elements."

"*Trav, Trav. Trav's* the first month of the year. And helium's

Trav, Yenth; Yenth is the eighth month."

"The inert elements could be called Group Eight, yes. And the third element, lithium, is Period Two, Group One. That check?"

"It certainly does. *Sanv, Trav; Sanv's* the second month. What's the first element in Period Three?"

"Sodium, Number Eleven."

"That's right; it's *Krav, Trav*. Why, the names of the months are simply numbers, one to ten, spelled out."

"*Doma's* the fifth month. That was your first Martian word, Martha," Penrose told her. "The word for five. And if *davas* is the word for metal, and *sornbulva* is chemistry and/or physics, I'll bet *Tadavas Sornbulva* is literally translated as: 'Of-Metal Matter-Knowledge.' Metallurgy, in other words. I wonder what *Mastbarnorvod* means." It surprised her that, after so long and with so much happening in the meantime, he could remember that. "Something like 'Journal,' or 'Review,' or maybe 'Quarterly.'"

"We'll work that out, too," she said confidently. After this, nothing seemed impossible. "Maybe we can find—" Then she stopped short. "You said 'Quarterly.' I think it was 'Monthly,' instead. It was dated for a specific month, the fifth one. And if *nor* is ten, *Mastbarnorvod* could be 'Year-Tenth.' And I'll bet we'll find that *mastbar* is the word for year." She looked at the table on the wall again. "Well, let's get all

these words down, with translations for as many as we can."

"Let's take a break for a minute," Penrose suggested, getting out his cigarettes. "And then, let's do this in comfort. Jeff, suppose you and Sid go across the hall and see what you find in the other room in the way of a desk or something like that, and a few chairs. There'll be a lot of work to do on this."

Sid Chamberlain had been squirming as though he were afflicted with ants, trying to contain himself. Now he let go with an excited jabber.

"This is really it! *The* it, not just it-of-the-week, like finding the reservoirs or those statues or this building, or even the animals and the dead Martians! Wait till Selim and Tony see this! Wait till Tony sees it; I want to see his face! And when I get this on telecast, all Terra's going to go nuts about it!" He turned to Captain Miles. "Jeff, suppose you take a look at that other door, while I find somebody to send to tell Selim and Tony. And Gloria; wait till she sees this—"

"Take it easy, Sid," Martha cautioned. "You'd better let me have a look at your script, before you go too far overboard on the telecast. This is just a beginning; it'll take years and years before we're able to read any of those books downstairs."

"It'll go faster than you think, Martha," Hubert Penrose told her. "We'll all work on it, and we'll teleprint material to Terra, and peo-

ple there will work on it. We'll send them everything we can . . . everything we work out, and copies of books, and copies of your word-lists—"

And there would be other tables—astronomical tables, tables in physics and mechanics, for instance—in which words and numbers were equivalent. The library stacks, below, would be full of them. Transliterate them into Roman alphabet spellings and Arabic numerals, and somewhere, somebody would spot each numerical significance, as Hubert Penrose and Mort Tranter and she had done with the table of elements. And pick out all the chemistry textbooks in the Library; new words would take on meaning from contexts in which the names of elements appeared. She'd have to start studying chemistry and physics, herself—

Sachiko Koremitsu peeped in through the door, then stepped inside.

"Is there anything I can do—?" she began. "What's happened? Something important?"

"Important?" Sid Chamberlain exploded. "Look at that, Sachi! We're reading it! Martha's found out how to read Martian!" He grabbed Captain Miles by the arm. "Come on, Jeff; let's go. I want to call the others—" He was still babbling as he hurried from the room.

Sachi looked at the inscription. "Is it true?" she asked, and then, before Martha could more than be-

gin to explain, flung her arms around her. "Oh, it really is! You are reading it! I'm so happy!"

She had to start explaining again when Selim von Ohlmhorst entered. This time, she was able to finish.

"But, Martha, can you be really sure? You know, by now, that learning to read this language is as important to me as it is to you, but how can you be so sure that those words really mean things like hydrogen and helium and boron and oxygen? How do you know that their table of elements was anything like ours?"

Tranter and Penrose and Sachiko all looked at him in amazement.

"That isn't just the Martian table of elements; that's *the* table of elements. It's the only one there is," Mort Tranter almost exploded. "Look, hydrogen has one proton and one electron. If it had more of either, it wouldn't be hydrogen, it'd be something else. And the same with all the rest of the elements. And hydrogen on Mars is the same as hydrogen on Terra, or on Alpha Centauri, or in the next galaxy—

"You just set up those numbers, in that order, and any first-year chemistry student could tell you what elements they represented," Penrose said. "Could if he expected to make a passing grade, that is."

The old man shook his head slowly, smiling. "I'm afraid I wouldn't make a passing grade. I didn't know, or at least didn't realize, that. One of the things I'm going to place an order for, to be brought on the

Schiaparelli, will be a set of primers in chemistry and physics, of the sort intended for a bright child of ten or twelve. It seems that a Martiologist has to learn a lot of things the Hittites and the Assyrians never heard about."

Tony Lattimer, coming in, caught the last part of the explanation. He looked quickly at the walls and, having found out just what had happened, advanced and caught Martha by the hand.

"You really did it, Martha! You found your bilingual! I never believed that it would be possible; let me congratulate you!"

He probably expected that to erase all the jibes and sneers of the past. If he did, he could have it that way. His friendship would mean as little to her as his derision—except that his friends had to watch their backs and his knife. But he was going home on the *Cyrano*, to be a big-shot. Or had this changed his mind for him again?

"This is something we can show the world, to justify any expenditure of time and money on Martian archaeological work. When I get back to Terra, I'll see that you're given full credit for this achievement—"

On Terra, her back and his knife would be out of her watchfulness.

"We won't need to wait that long," Hubert Penrose told him dryly. "I'm sending off an official report, tomorrow; you can be sure Dr. Dane will be given full credit, not only for this but for her pre-

vious work, which made it possible to exploit this discovery."

"And you might add, work done in spite of the doubts and discouragements of her colleagues," Selim von Ohlmhorst said. "To which I am ashamed to have to confess my own share."

"You said we had to find a bi-

lingual," she said. "You were right, too."

"This is better than a bilingual, Martha," Hubert Penrose said. "Physical science expresses universal facts; necessarily it is a universal language. Heretofore archeologists have dealt only with pre-scientific cultures."

THE END

IN TIMES TO COME

Next issue starts Robert Randall's new serial, "The Dawning Light," which tells of bank robbers who didn't want the money they stole. Also of the destruction of a culture so that the culture wouldn't die, and, incidentally, liars whose deadly effective lies were the exact and literal truth. Nidor, in other words, was in for a massive dose of trouble—with reasons that were perfectly concealed because they were so obvious no one would think of believing it!

Robert Randall has been having fun—and it's my guess that you will, too!

Also coming next month, the first of a series of articles by Isaac Asimov on the development of the atmospheres of planets, and the subsequent development of living organisms. Next month's article—complete in itself, and extremely interesting—is "Planets Have An Air About Them."

You know, they do, at that! They're called planetoids if they don't!

THE EDITOR.

UNLUCKY CHANCE

BY M. C. PEASE

About once a generation—once in say two billion times—a human being with strange talents turns up. Could be that the long-shot odds could turn up....

Illustrated by van Dongen

The whole thing was a pity, as far as Martha was concerned. It didn't seem fair at all. With all the millions of humans around, there was no good reason at all why she should be the one.

Joe, of course, was lucky. True, he got a broken leg and a pair of cracked ribs. But also he was able to take the best pictures of his life. And Joe, being what he was, would cheerfully have traded both legs, cut off short, for that kind of picture.

He also got a huge bonus from his paper, which was nice, too.

It was only Martha who was unlucky. Not that she got hurt, just somewhat bruised and mostly scared. Which, for anybody married to Joe when a story broke in his own back

yard, was doing very well indeed. But the trouble was what happened afterwards. Which wasn't at all the kind of thing she wanted. The way she saw it, Joe was the character of the family. And the family, and probably the town, too, could only stand one such character. All of which meant she just wasn't ready for that sort of thing, and had no intention of ever getting ready.

No, you got to admit that Martha was just plain unlucky.

As far as that goes, she figured she was unlucky when the sphere first showed up. She was out in the yard at the time, trying to keep her three-year-old, Micky, herded out of the flowers. When the neighbors started shouting, she looked up and there it was. If she hadn't been a

lady, she would have sworn. And only the fact that she knew her duty when she saw it made her call to Joe.

It wasn't that she had anything much against the spheres. She'd been willing to read about them in the papers, and to listen tolerantly when sundry people gave profound opinions on TV. She was even willing to believe in them, more or less. Except that the stories sounded so strange. It wasn't right, somehow, for ten-foot spheres to go floating around the countryside. Not transparent ones, anyway, with no machinery at all inside them. And the people in them. Just staring down at the people staring up at them. Not the right thing at all. And it was worse that there seemed to be some question of whether these were people. They weren't, thank heaven, the little green men or whatever, that they might have been. Apparently they looked human, more or less. But enough less to make all the difference. And this wasn't proper, either.

And neither was it proper that the Air Force was officially on record as not knowing what to do about them. It wasn't right. The way taxes were, you certainly had a right to expect more than that from the Air Force. Getting their airplanes blown up whenever they came close to one. It wasn't right, after all the money they'd spent.

No, Martha was willing to believe in the spheres, but it still wasn't right to have one of them

come over your own back yard.

And it was just that much worse when it landed.

Whether Martha noticed that it slid over a pair of her favorite roses and finally stopped in the middle of her petunias is somewhat doubtful. The whole thing was too appalling, anyway. The fact that she could hear Joe, behind her, busy with his camera—by the sounds he had brought the big one—didn't please her any, either. With an angry shrug, she wondered what she was. Local interest? The symbolic "representative of mankind on this historic occasion?" Well, he could just lump it. As for her, she wanted nothing of these . . . these—What were they, anyway?

They were, of course, people. And yet they weren't. There were two of them, sitting in their glass ball, just gazing around. They sat like people, only the angles were not quite right. Their legs bent around the center post of their seats in a way that certainly should be uncomfortable. And their arms lay on their knees in a funny way. Their faces had the usual features but the proportions seemed wrong. And their hair had a definite greenish tint. Quite odd. They looked like dolls made by somebody who did not quite know what the human body was like.

But the worst of it was their faces. The expression—or lack of it. Doll faces. Perfectly made, but blank. Their faces moved, and may-

be others of their kind could read those faces, but there was no human expression. No sign at all that they thought of humans as anything special at all. And looking at them, Martha felt cold deep down inside her.

When the aliens got up and stretched, it seemed a little better. They looked more human, then. Like people, pulling the kinks out of muscles after a period of intense concentration. And there seemed to be some humor, too, in their expressions as they looked first at her, and then, with a sweeping glance behind her.

Looking around, too, Martha saw the rows of neighbors, each group lined up at their own hedges and fences, apparently too stunned to

know what to do. And, by the silence, too stunned even to talk. But that, of course, would come later.

Looking back at the aliens, she saw that they were pointing at something and talking to each other. She could hear their voices and she realized a section of their sphere had slid open. Though it was certainly like no language she had ever heard, they sounded pleased and excited. And then one spoke what seemed to be words of command.

She turned to see what they were talking about. Apparently it was Micky's little red fire-wagon—the kind a child can get into and pump himself around in. It must have been what they had been looking at because it was the only thing there except the grass itself. And



besides, it was answering their command.

Now Martha was a perfectly level-headed girl. She often said so herself. And certainly no level-headed girl would ever take any serious stock in telepathy, telekinesis, and the rest of that sort of thing. The very idea was ridiculous. In fact, it was only because of Joe that she even knew the words. Working on a newspaper, he came home with all sorts of ideas. And reading science fiction, he developed some ideas of his own. And Martha did her best to be tolerant because she did love him and that was the way he was. Except, of course, when he tried to make out that she might have special talents. Like the time she went up just to take a peek at Micky and arrived just in time to catch him as he fell out of his crib. And that other time . . . but it was perfectly ridiculous. Sheer coincidence or maternal instinct or something. And he had no right to try to make anything more out of it.

But anyway, she knew what telekinesis was supposed to be. And though she knew the whole idea was pure fantasy, still it helped to know the name.

Because Micky's fire truck was floating through the air towards the sphere. And since there was no machinery in the sphere, it must be direct mental control. The aliens were willing the fire engine to rise and float towards them. And the toy was doing just that, though any

sensible person must know that such things don't happen.

In retrospect, we can adopt a superior attitude and say that little damage would have been done, if only the matter had been left at that point. It seems clear that the aliens had no malice—in fact, very little interest—in people. They were interested in the fire truck. They might have just wanted to look at it. Or, perhaps they would have taken it with them. But even this would not have been a disaster.

But superior attitudes have little effect on children, and Micky loved that fire truck. At least, he did at the moment. And when he saw it sailing away, it suddenly became of vast importance. He started chasing it as fast as his stubby legs could carry him, howling with anguish.

What the aliens thought will never be known. What they did is clear. They simply wrapped Micky up in their mental force field. Apparently it did not hurt him. At least he kept on howling and kicking and wriggling with even more violence than before. Except that he was now doing it six inches above the ground and not progressing at all.

Martha, her instincts taking over, jumped towards Micky. Then, realizing he was not hurt, she stopped and looked at the aliens. They were watching her, she saw, apparently alert to see what she did, but they had made no move to stop her. It seemed obvious, though, that they

would protect themselves if she turned towards them. Of a sudden, she realized she hated them, but she also realized she feared them.

It was then that she saw Joe. Camera still in hand, he had apparently circled around to come up behind them. He was coming in towards the sphere at a dead run, his face intent and rigid, his beloved camera held like a club.

As he swung out to circle the sphere and get to the aliens, one of them suddenly spun around to face him. Dropping to one knee, the alien shot out his finger and pointed at Joe, crying some unintelligible word as he did.

As if in a dream of unreality, Martha saw Joe lift up off the ground and somersault backward. Spinning through the air, he twisted backward until he crashed against a tree. Like a broken doll he slumped down to its base, one leg twisted under him as it should not be, agony written on his face.

Turning back to the aliens as the prime cause, Martha glared at them, feeling a red flame build up in her, hardly conscious she was moving towards them. When they put a mental clamp on her, when she felt suddenly as if she moved in heavy oil, each motion against a heavy weight, the flame burned down to a white point and she kept moving.

Suddenly conscious that she was up in the air about two feet, she felt the flame burn hotter still, concentrating itself down towards the ultimate force. She willed herself

back to the ground and felt it solid beneath her once more. And she kept on moving towards them.

When the force broke, she actually stumbled and fell to her hands and knees. It was as if a rope she had been leaning against had broken. But it was good to feel the grass and there was only the one small thought that she had probably stained her dress.

Looking up, she saw the aliens staring at her and felt the fire gather again within her. She saw them whirl and leap for their seats. She saw the section of the sphere that had been open slide back into place. And the sphere shot skyward. Like the wake of a boat, she felt the eddies of mental force that pushed it, and she knew that it was gone.

Picking herself up, she ran first to look at Micky. He was sitting on the grass staring up into the sky, looking as if he wished he had such a nice toy. She was sure that he was going to cry in a moment, but she was also sure he was not hurt. She turned to Joe.

Joe still was at the base of the tree, his leg still twisted under him. But he had shifted around slightly, she saw, and was apparently taking pictures as fast as he could manipulate the camera. There was an air about him of satisfaction, of knowledge of a job well done. As the sphere disappeared in the sky, he laid down the camera with a small sigh and slumped down unconscious.

It was at the hospital later that Martha discovered the full horror of the situation, that she found out just how unlucky she had been.

Joe was lying flat in his bed, his leg in its plaster mold strung up on pulleys, his chest wrapped up to keep his cracked ribs in place. But he looked supremely happy. Prints of his pictures were scattered about the bed. Newspapers from all over the country were stacked on the bureau and each one, she knew, had one or more of his pictures on its front page. He was, she suspected, already starting to consider which one to submit to the annual competition.

She, on the other hand, was feeling quite upset. There had been whole batteries of reporters to face. And then the Army. And the Navy and the Air Force. Even the F.B.I. had shown up. Millions of questions, most of which didn't seem to have anything much to do with anything. And there would be more when she left Joe.

"The trouble is," she told Joe, "the only thing they seem to want to know is why they left. My goodness, you'd think they'd be glad that they did leave. The Army and all's supposed to protect people, isn't it? Not just come around afterwards when the enemy's finally up and left. You'd think we'd done a crime or something. I certainly didn't invite them to come bouncing down in our back yard. And certainly I wasn't going to stop them when they finally had the de-

cency to go back where they belonged."

Joe smiled, his eyes twinkling in secret humor. "Yes, dear," he answered. "Only the Army and all naturally want to know what made them go. Because maybe they'll come back. And you're right that it's the job of the Services to protect the people. So naturally they want to know how to do it if the situation comes up again." His mouth twitched upwards. "Did you tell them?"

"Tell them?" she cried. "How could I? They just up and left."

"I don't think so," Joe answered, his voice gentle. "I was watching and I don't think it was that simple at all. For one thing, I think they left scared. And maybe with good reason."

"What do you mean?" Martha asked. She knew that tone of Joe's voice, and it kind of scared her.

"Get me that top paper, will you," Joe asked, reaching out with his hand to hold her wrist. "No, stay here. Just bring over the paper."

She looked at him puzzled. Of course she couldn't reach the paper. What did he think? Was he making fun of her? There was an odd look about his eyes. She rather thought he was. And after all she'd been through, too. While he had nothing to do but lie there on the hospital bed while pretty nurses kept fluttering around him. He just didn't understand.

She felt the small flame of anger rise in her. She would like to take

that paper and throw it in his face, making fun of her at a time like this. She'd just like to throw it right smack in his face.

As he pushed the paper off his face his eyes still twinkled even while he said: "Hey, take it easy, will you?" And he lay there, calmly waiting for her to see what she had done.

It was a moment before she realized. Then, groping for a chair, she sat down heavily. With eyes in which shock was slowly growing, she looked again at the pile of newspapers. And when the top one slowly slid halfway off the pile, she looked back at him with her mouth half open, eyes blank.

"Take it easy, baby," Joe said gently. "The way I figure it, you've always had the talent. Sometimes I've suspected it, but I was never sure. But now I figure you've always had it, only without knowing how to use it. And when these boys in the sphere came down and started to use that same kind of thing on us, you got scared and mad. And maybe that did it, or maybe you learned from them. Anyway, I think you all of a sudden knew what to do.

"And I think, too, they felt this, which is why they left in a hurry.

I think they'd run into something they hadn't thought was possible. I don't think they liked it. I wonder if the Army and the rest will like it either?"

He watched her calmly for a moment, and then went on in an even gentler voice: "And there's something else, baby. Maybe you could hide this talent you got, but I kind of doubt it. I got a feeling it's going to be happening all the time for you, now you know how to do it. A little hidden thought, and before you know it, the sugar's sliding across the table to you.

"And so, my little wife, you'd better start facing the fact that you're unique. You're very, very special, and everybody's going to know it."

"No!" she cried out, bursting into tears. As she felt Joe's strong hand on hers, she started to sob. Why, why did it have to be her? Of all the people in the world, why did she have to be the one? It wasn't fair. Not fair at all. She'd always been a sensible person, doing her duty, and even trying to be tolerant of her husband's strange ideas. It just plain wasn't fair.

She didn't deserve to be so unlucky.

THE END



UNPROVABLE SPECULATION

Reporting further researches on the Hieronymus machine. After the first tests, I knew it wasn't a "scientific" device—but the present form conclusively establishes that, whatever it is, it isn't operating on physical-science principles!

The photographs accompanying this article show a device I built up after some considerable experimenting with the Hieronymus machine, and other psionic devices, and after a considerable amount of discussion with other people who had worked with such devices for a good many years. The contraption, as the photographs clearly show, is a standard electronics-type black-crackle finish cabinet, with a bakelite panel, a National Velvet Vernier dial, and a small pick-up loop, plus a switch and pilot light on the outside.

Inside, there is a small transformer which supplies power to the pilot lamp only, and a circuit diagram drawn in India ink on standard drafting paper, plus a piece of plastic, symbolizing a prism, mounted on the rotating shaft of the dial mechanism.

The device was built as a crucial experiment, to test a theory derived from study of the psionic devices I'd found out about. The circuit diagram symbolizes essentially, a sim-

plified version of the Hieronymus machine, using a one-stage vacuum tube amplifier instead of a three-stage unit.

This device behaves essentially as the Hieronymus machine does. Many volunteers have tried it, and gotten results fully equivalent to the results obtained on the Hieronymus machine itself.

It's easy to see why scientists, investigating such devices, have reported them absolute nonsense, hoaxes, et cetera. People who've tried out this Campbell device, and then been shown the inside, usually say, "Why . . . there's nothing in it!"

There is something in it, though; herein lies the trouble. We've been calling this field "psionics" and referring to "psi" powers; we can, if you're willing, be more honest and more fundamental; we're studying Magic, and working with charms.

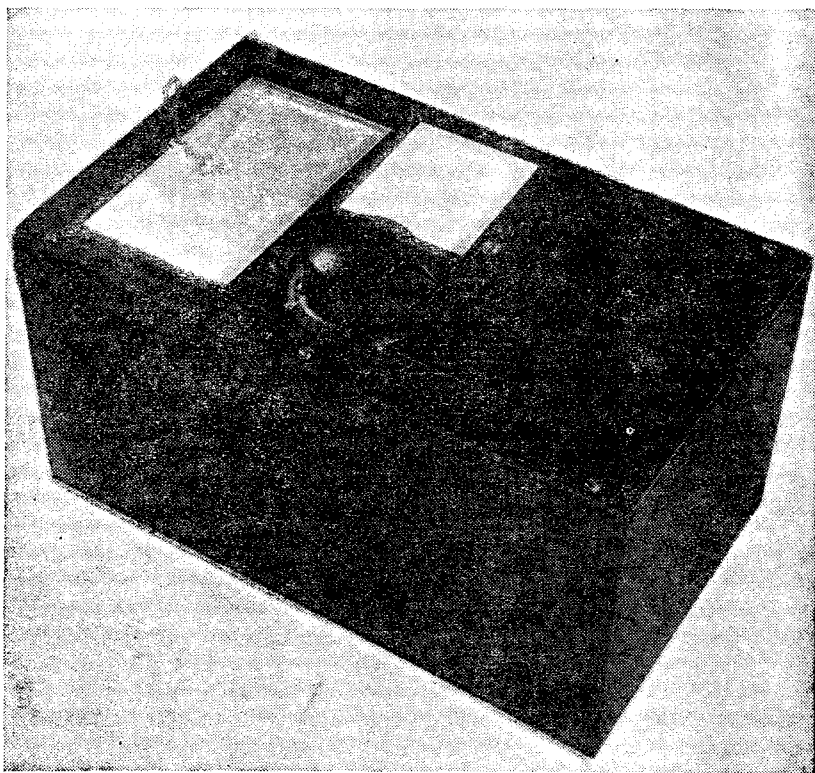
The circuit diagram is drawn with standard India ink, on standard drafting paper, using standard

electronic symbols, plus a symbolic representation of the "opaque insulating material" called for in the Hieronymus machine. It is, essentially, a charmed device, on which certain strange symbols have been inscribed to give it Powers.

In our culture, "Magic" has been defined as "that silly superstitious stuff our foolish ancestors used to believe in."

One thing bothers me. All of our ancestors, for several hundred

thousand years, apparently, believed in Magic. The Mendelian laws seem to have broken down completely, by some miracle; if all of our ancestors were fools, how come we moderns are suddenly so smart? Maybe we're a bunch of mutants, but I rather doubt it. It seems somewhat more probable to me, rather than accepting the sudden suspension of genetic laws, that our ancestors were not quite such stupid fools as is generally held. Maybe they had some



External appearance of the symbolic type Hieronymus machine.

evidence—particularly, maybe there is something in charms. Provided you redefine the currently-accepted concept, which holds that a charm is "silly nonsense having no real effect."

First, as to whether the circuit diagram on the Campbell device here pictured is "nothing": Please note this fact; if you go out to Los Alamos National Laboratory, and remove some of the circuit diagrams and other charmed papers they have in their files there, if circuit diagrams are "nothing," then you are very likely to be shot dead for "nothing." The simple fact of the matter is that the Los Alamos authorities regard those symbols and marks on paper as having Powers which they guard zealously.

Is specific information "nothing"?

I've done considerable experimenting with this gimmick; over a hundred volunteers have experimented with it, and discussed the matter with me afterward. At this point, I've learned a great deal about the problem—the problem of discussing it, that is. Since you readers can't be present to discuss back and forth with me, I'm going to state the fundamental rules of discussion as they have to be at this time.

1. I absolutely, completely, and unequivocally refuse to argue the validity of any of the inductive conclusions, usually called "opinions," which I have reached. Reason: they, and any and all other opinions, are inherently unarguable; to attempt to

argue the unarguable is a futile waste of time, effort, and energy.

The reason for the above statement is this: There is in our whole philosophy, *no formal, disciplined method* for going from individual data, to a specific inductive conclusion. There are statistical methods for deriving a correlation between A and B, but no method of generating a true, specific postulate is known.

"Argument" differs from "discussion," in that "argument" implies a disciplined, formal discussion, conducted under agreed-on rules, following agreed-on principles. "Argument" must, therefore, be logical; it is confined to logic, and cannot be extended into areas where logical methods are inapplicable.

Logic is inherently incapable of generating a postulate; logic can argue *from* a postulate, but there is no logical means of arguing *to* a postulate. Postulates—axioms—are said to be "intuitively true," like Euclid's axiom of parallel lines. (Which turned out to be intuitively true, but factually false.)

Since logic cannot generate a postulate, then logic is inapplicable to the problem of thinking from specific data to reach any general law. Notice that Newton, who may or may not have been triggered by having an apple hit him on the head, never defended, described, or discussed how he came to the conclusion represented by the Law of Gravity. There never has been, and is not now, any defensible method

of going from the data on planetary motions to the Law of Gravity—Newtonian or Einsteinian either. The only defense we can give for any postulate is, "Well, it gives useful results. It works, doesn't it?"

That is *not* a logical answer; it's an experimental-pragmatic answer, and is, logically, invalid.

One error in our logical operations has confused this issue; the error is a failure to differentiate between two basic processes. The number 12 can be derived either as the sum of 6 and 6 or as the product of 3×4 ; are the two quantities identical?

Arithmetically, they are; as quantities they are equal. But they have fundamentally different qualities, despite their quantitative equality, because of the difference of process involved in their generation. The product of 3×4 is inherently quadratic in nature—it's inherently two-dimensional. The sum of 6 and 6 is a linear quantity; it's inherently one-dimensional.

In working with alternating current, the early electrical engineers ran into an extremely puzzling and frustrating phenomenon; in Direct Current work, watts of power always equaled volts times current. But in AC circuits, volts and amperes could get out of phase, so that one might have 100 volts times 5 amperes—and just what "500 watts" meant was something of a puzzle. It was a problem that was solved practically by arbitrarily deciding

that power was a quadratic function, and only the square root of power-quantity had meaning. The square root of 500 is, of course, imaginary, even though 500 itself is not imaginary.

Anyone who's worked with resonant circuits has discovered by experience that you can have 10,000 volts and 20 amperes—and about 10 watts of real power. In some laboratory work, the ratio of imaginary to real power in a resonant circuit has gone as high as 60,000,000 to 1. That comes as close to a physical demonstration of the old Biblical phrase "Full of sound and fury, signifying nothing," as anything I know of.

But notice that it is perfectly possible to get meters to read the *fact* that there are 10,000 volts, and that there are 20 amperes.

In considering any question, it is essential that we carefully distinguish between product-resultants and sum-resultants; they have different characteristics. Power is a product-resultant; voltage, on the other hand, is a sum-resultant.

Consider the concept Visibility. That, too, is in fact a product-resultant. We can demonstrate that by the fundamental difference between product-resultants and sum-resultants with respect to their behavior in relation to Zero. In the equation $a + b = c$, if either a or b is zero, c is equal to the other term. But in $p \times q = n$, if either p or q is zero, n is zero.

In Logic, the first condition, the

sum-resultant, is expressed by "If a or b, then c," while the second, the product resultant, by "If p and q, then and only then, n."

"Visibility" belongs to the latter class. There must be a Class Object, and a Class Illumination; then and only then is there the product-resultant Visibility. If the Class Object is an empty class (zero), or the Class Illumination is an empty class, then Visibility is also an empty class.

The point of that discussion? Inductive conclusions are a product-resultant; the product of data and a disciplined process of inductive thinking. If either the Class Data or the Class "Disciplined process of inductive thinking" is an empty class, then "Inductive Conclusions" reduces to an Empty Class also. You can't reach a proper, arguable and defensible Inductive Conclusion if you have no data. And you cannot reach a proper, arguable and defensible conclusion in the absence of a disciplined process of inductive thinking.

But . . . there is no disciplined, formal process of inductive thinking.

Therefore, so far as formal argument or discussion goes, *all* inductive conclusions, without any exceptions whatsoever, have precisely the value—zero!

This is simply an effort to establish a formal proof of the proposition that it is inherently impossible to argue inductive conclusions—to ask Newton to "prove he has a right

to induce the Law of Gravity from this data."

This simply means that the old proposition "I have as much right to my opinion as you have to yours!" is entirely correct and valid; the one error is that that right turns out, on the above analysis, to be Zero! Everybody, in other words, has the same—Zero—right to his opinion.

The practical answer is, obviously, that opinions differ in value solely on the basis that some are a darned sight more useful than others. If Bill Blow is of the opinion he's really Napoleon, the opinion is useless . . . unless he happens to be an actor playing on the New York stage and, by having that opinion, can present Napoleon with a sense of reality otherwise unattainable. Newton's opinion concerning the Law of Gravity, we now know, was wrong in detail, but most exceedingly useful.

Because of the situation resulting from our total lack of any formal, agreed-on discipline of inductive thinking, a lot of important creative work has been horrendously hampered. A man attempting to achieve a real result, who has done some highly useful inductive thinking, can be forced to waste his time and effort defending the indefensible; he hasn't yet completed the structure of thought that will be useful in deducing workable and pragmatic devices, but has half-completed the inductive process. He's like a man with a half-wired-up

radio receiver who is faced with a demand to prove his radio works. It doesn't, of course.

An enormous amount of valuable human effort has been effectively sabotaged by attacking an incomplete structure as "wrong." It is absolutely futile for anyone to seek to defend an inductive process; it can be attacked, but cannot be defended because there is no agreed-on discipline of specific inductive thinking.

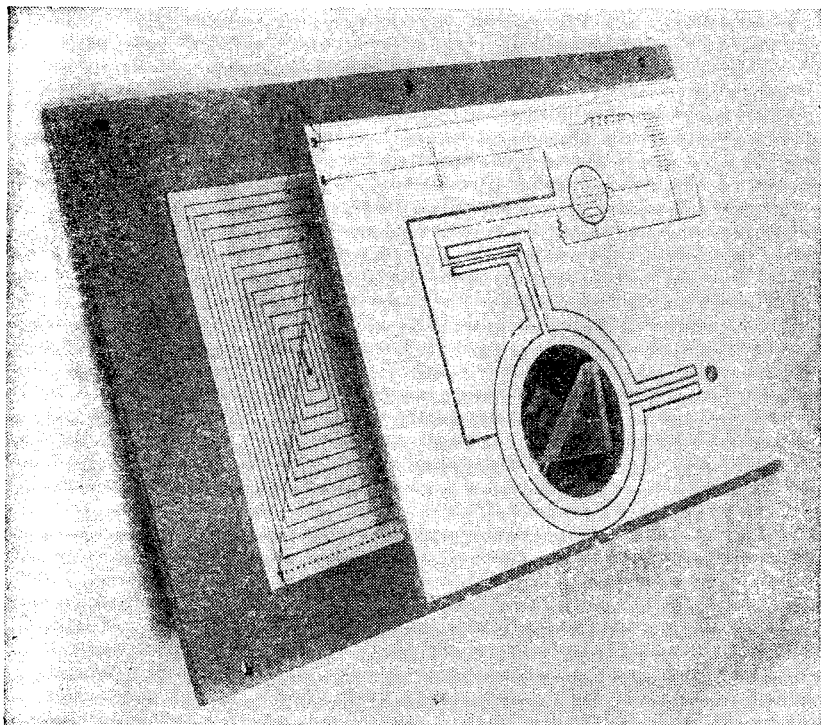
For that reason, I freely recognize that I am totally unable to defend the following inductive conclusions; their formal-argument value is zero. I do not, therefore, intend to call them "conclusions," which implies some formal thinking process has yielded them as resultants. Instead, I will use the perfectly good English term "hunch," which means an unexplainable, undefensible opinion, which is held on an "I am not sure, but I think it's worth trying out," basis.

It would be a futile waste of time and effort to seek to defend these hunches; please don't ask me to do so. But—please have the self-discipline to recognize that you, too, can have nothing more valid than hunches, so long as no process of inductive thinking is possible. *All* postulates used in Science, and even in Logic itself, are purely hunches. Euclid's hunches were useful, but we know, now, that they were not correct—despite the millennia of agreement they achieved.

Until such time as a formal discipline of inductive thought can be worked out, no human being can do more than reason from hunches, by a system of Logic based on hunches. (Can you *prove* that *everything* in the Universe either is or is not A? That's just a hunch, of course. So are all the other basic axioms of Logic.)

I am an amateur psionist—or Magician, if you want; when neither term has a sound, inclusive and exclusive definition, what difference does it make what you call it?—and as an amateur, I have no authority in the field. I can state what I have done, and what appeared to me to happen, and that cannot be argued because it's simply data. I can state my resultant hunches—and they cannot be argued, because there is no disciplined system for arguing inductive processes.

As an amateur, I am not seeking to convince anyone of anything beyond the fact that I did certain things, and had fun doing them. Anyone anywhere has an equal right to have alternative hunches as to the significance of the facts I observed. Because, as an amateur, I have no responsibility to anyone else to establish the factual validity of my observations, I am not going to seek to do so. Anyone interested can try the same for himself; I'll be happy to do what I can to help on that, but there is no reason whatsoever for demanding of me, as an amateur, that I *must*. Only a professional, who claims authoritative knowledge,



This, and photo on page 61, make clear the internal relationships, and the circuit-diagram unit. The inked spiral coil is linked to the output terminals of the diagram with nylon threads. The two-level arrangement was required to accommodate the National Velvet Vernier dial drive mechanism. The "prism" is a 45° triangle cut from a handy scrap of plastic, cemented on a 1/4-inch plastic rod which fitted the dial mechanism.

must submit to demands that he prove his knowledge. I am not a professional in anything whatsoever save science-fiction editing.

A professional gets paid for his work; I get paid only for science-fiction editing. Until such time as someone wants to pay me as a professional psionist, no one can demand that I prove my knowledge. Until that time, this is a friendly, let's - have - fun - exploring business.

We can have some fine, bull-session discussions, but I resent and refuse to accept any challenges on the basis that I must defend my conclusions. I don't know anything; I have hunches.

Fair enough?

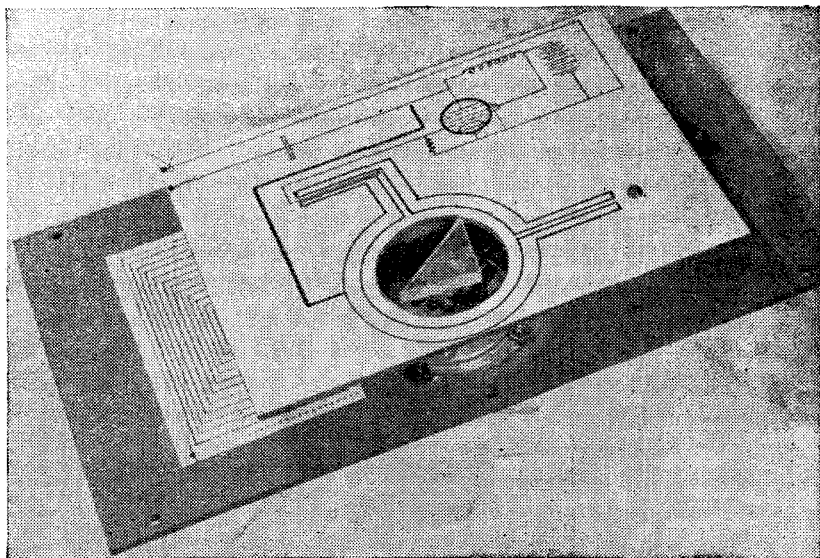
The version of psionic machine shown in the accompanying photographs resulted as a crucial experiment based on an hypothesis de-

rived from information I'd accumulated from studying various psionic machines. These various units included the Hieronymus machine as the one I'd studied most, but also included the Drown machine, the De la Warr machine, and three or four others, that are less well-known. Most of these devices derive from the original work of Dr. Abrams, who started the field back in the '20s, doing work on a medical diagnostic and therapeutic device.

The Drown and De la Warr machines both use a bank of ten-position rotary switches, plus an input receptacle, and a tactile detector. They, however, do not use electronic amplifiers, although they use electrical switches and wiring. But

neither of these machines behaves like a reasonable electrical device; the ten-position switches are functional, and necessary to the operation of the devices—yet the switches can be wired together in parallel, series, or haphazardly, and all ten positions on each switch are simply wired together so that, electrically, it makes no difference which position the switch is in!

Yet these devices produced real results in the hands of some operators. The De la Warr machine, I knew, had been used to diagnose the condition of a small girl, from a drop of her blood. A drop of blood was put on a piece of white blotting paper, and mailed from New York to Oxford, England, where the De la Warr laboratories



are, together with the name and address, and the small fee charged by the De la Warr Laboratories. The Laboratory group returned a folder diagnosing the girl's condition: "complete degeneration of the left optic nerve and retina; severe impairment of the right optic nerve and retina. Loss of vision is complete in the left eye, and the right eye's vision is seriously impaired. The condition is the result of injury at, or immediately following birth."

The girl had been born prematurely, and had required oxygen in order to live. Medical science learned considerably later that if excessive oxygen is given premature babies, the development of the optic nerve system is seriously upset. The diagnosis by mail had been perfectly accurate; since no disease organism, or blood anomaly was involved, no biochemical or biological examination of the drop of blood would have made the diagnosis possible.

A similar blood-drop sample was submitted to the Drown Laboratories, on the West Coast; an essentially similar diagnostic report was sent back.

The devices were investigated by the AMA some years ago; their conclusion was that they were useless and illusory. The evidence accumulated by the AMA indicated they gave wrong, or completely nonsensical reports. In one case, one user of one of the Abrams machines gave a diagnosis on a drop of blood, but reported some remarkable com-

plaints, in view of the fact that the blood came from a Plymouth Rock rooster instead of a human being.

Evidently the devices are unreliable, and are definitely not suitable for any professional use at the present stage of development. But . . . for amateur experimentation, they seem to me to be highly interesting; I can't reach Australia with my ham radio transmitter on any regular basis, and it is, therefore, a completely unusable system as a professional service. But I *can* reach Australia, and have documentary proof of that fact. For amateur experimenting, it's fine business. RCA Communications doesn't try to reach Australia with thirty-five watts of RF power, from the New York area; they use kilowatts, and go about it professionally. (And even so they can't always make it! Sometimes a solar flare knocks all radio channels for a loop.)

The records of the Drown and De la Warr Laboratories, however, seem to indicate that certain individual operators can get highly reliable results. After all, not all operators can play a violin and reliably get the right notes.

But what interested me was the fact that these devices did get some results. If you found that, in a shipment of three-inch steel bolts, two of the bolts had an annoying tendency to float up toward the ceiling, you could, of course, simply discard those two as defective, ignore them, and go on about your busi-

ness. Two out of a thousand, let's say, aren't worth the trouble of complaining to the manufacturer, after all—

But it might, on the other hand, be rather interesting to try to find out what in blazes made two solid steel rods float skyward, in the absence of any magnetic field.

The fact that those devices do, even occasionally, produce results is, definitely, something worth an amateur's investigation.

The Drown and De la Warr machines have several things in common with the Hieronymus machine; they use the tactile sensing detector, and, like the Hieronymus machine, make no sense whatever as physical-science devices. Any physical scientist looking at the meaningless wiring of the switch-systems would immediately "know" the thing was a hoax. (His right to that opinion is, however, zero, since there is no disciplined method of going from observational data to conclusion. Properly, he has a strong hunch that the thing is a hoax—and no right to claim anything more than a hunch.)

The Hieronymus machine worked, and worked as well without the power supply as it did with it. But it wouldn't work if a tube burned out. The other devices worked without any power supply to begin with—and wouldn't work if one of the random-seeming wires came unsoldered. Whatever they were, they were definitely *not* physical science devices.

The people who used them, kept talking about "radiations"; I threw that out early. A radiation is a specific, sharply defined class of entities, having specifically defined characteristics. One characteristic involves wave-length, whether it's a particle radiation such as electrons, or an electromagnetic radiation such as gamma rays or light. Any and all radiations, by their definition, involve distance.

And all the workers with these devices, like Dr. Rhine's work with ESP, maintain that distance has no effect on the process.

No radiation can be unrelated to distance; the definition of radiation is such that distance is inherently built-in.

So we can throw out all the blather about "radiations" and "vibrations" and "frequencies" at the start, and realize that whatever it is, it is not "radiation." Certainly the brain generates electrical waves; we can, however, drop brain-waves as an explanation of ESP or psi phenomena, because waves and radiation have a distance-linked structure, and the evidence concerning ESP and psi is that these specifically do not.

For me, my hunch was that the "eloptic radiation" theory of Hieronymus was included in that "It is *not* radiation."

Fine, but what *was* it?

I can't defend, or even describe, the process by which I arrived at the hunch "These things depend on relationship - as - a - thing - in -

itself." Taking that hunch as a postulate, however, we can do some deductive thinking, and make some physical-equipment tests.

First, if relationship-per se is involved, then the presence or absence of a power supply in the Hieronymus machine would make no difference; it doesn't change the relationship of the parts. But a burned out tube *would* make a difference; it would alter the relationship of the parts.

And the seemingly random wiring system, and all soldered-together switches of the Drown and De la Warr machines would also make sense; it was the *position* of the switch—its *relationship* that counted. But a loose connection that came unsoldered would introduce a false relationship.

Now geometry is a system of spatial relationships; chronology is a system of temporal relationships. Einstein worked out a formula for inter-relating temporal and spatial dimensions. Each concerns intervals along axes. Are there any other intervals, any other measures-of-relationships known to Man?

There are indeed. Is a second cousin more closely, or less closely related to you than a first cousin twice removed?

If you're in the engineering department, what's your relationship, on the company organizational chart, to the vice president in charge of sales?

Which is closer in relationship to

the United States, Guatemala or England?

Certainly we have no mensuration formulas for such problems—though, as any human being living in the human world-system knows, those relationship problems are real, and have immense importance and effect. Lawyers have beautiful charts to specify the degree of relationship between cousins; they had to work out some sort of system for dividing up large estates. Diplomatic protocol officers have, as their life-work, analysis of precisely such problems as that implied in the other questions.

Maybe this type of relationship isn't real in the highly limited sense of physical-reality—but see what happens to you when your distant Cousin Hephsebah dies, intestate, and leaves half a million dollars.

There's something here that human beings, at least, react to. Call it subjective, call it hoosenany flamstrahl, who cares. There's something. And it certainly hasn't been investigated very thoroughly!

"Subjective reality?" What does that mean? "Just psychological?" What does that mean? "Everybody knows why things fall; it's gravity." And don't you wish you knew what that was?

Relationship-per se seems to be best concentrated, in the purest state, when we deal with purely symbolic things. The closer we get to a pure symbol, the less objective reality we have, and the more nearly pure-relationship we have. A let-

ter A scratched in mud is a symbol; it has precisely the same symbol-properties as a letter A made of reinforced concrete and standing forty feet high. The material object structure has zero significance; only the relationship-pattern has meaning.

O.K.—let's make a deduction. If it is relationship-pattern, and relationship-pattern alone that is significant in psi machines such as the Hieronymus machine, then we should be able to leave out all the *material object system*, and obtain the same results.

The experiment seemed worth trying, to check, to some degree, the hunch. The device in the photographs resulted. It is a circuit diagram of an Hieronymus machine, simplified to a one-stage amplifier, battery powered—by a purely symbolic battery—and mechanically simplified by using a rotating prism—also purely symbolic; it's a triangle of polystyrene mounted on the rotating shaft of the dial mechanism—instead of a moving electrode. If the essential element of the Hieronymus machine was a pattern or relationship, containing one adjustable relationship-part, then I had retained the relationship-pattern, although discarding all material, physical objects.

The new device was built in a standard black-crackle finish electronics components box, and a functionless pilot light installed "for psychological effect," whatever that may mean, and set up for testing.

The first test subject was, again, my youngest daughter. I used a standard test-bar, a small ingot of scrap lead, containing lead, tin, and unknown additional impurities. (Since some type metal went into the melting pot, it has quite a collection of substances!)

She got response; she reported the "tacky" feeling at about 42 to 46 on the dial. (The dial is a standard National Velvet Vernier dial, calibrated from 0 to 100 over 180°; only 90° are used, since the 45° prism is symmetrical around a 90° point.) She was able to retune to the same dial reading, plus or minus about 2 divisions, when I returned the dial to zero and blocked her view of the dial.

Since then, approximately one hundred volunteers have tried it; not all who have tried it get any response. Some get responses all over the place. (These few, incidentally, were extremely anxious to work with it; they were long-time convinced mystics. Trouble is, a completely unselective response is as useless as no response. These anything-goes responses were classified as "No Response.")

Of those who got repeatable responses, the responses came at three points on the dial: 45, 30 and 22, plus or minus about two dial divisions. Apparently, the 45 response is much the strongest; many individuals who responded at 45, did not find the 30 and 22 points. The 30 point is next easiest to detect, and

the 22 is the weakest that is regularly detected.

Now as to what is meant by "repeatable response": The individual volunteer is not told what the box contains, and is given only "Do this, and feel this, and look for a difference in the feeling of this surface." I deliberately misled the new volunteers, suggesting that it may feel as though it turned furry, like a kitten, or as though it changed shape, turning into a bowl.

Repeatably, most of the responders report, despite the misdirection, a tactile described either as "sticky," "tacky," "viscous," or "a drag." The thing is complex, however; there appears to be something best and most completely described as "like thick grease; viscous and resisting, but slick." Some few report that the surface feels "slick."

However, one girl who very repeatably found the same 45 point did so by tuning to the point at which she felt the strongest sense of emotional fear!

"No response" is scored if the individual volunteer cannot retune to one of the standard reference points without seeing the dial.

That is, a "repeatable response" is scored when:—

1. The individual volunteer can return to the same dial marking, plus or minus two divisions, without being able to see the dial.

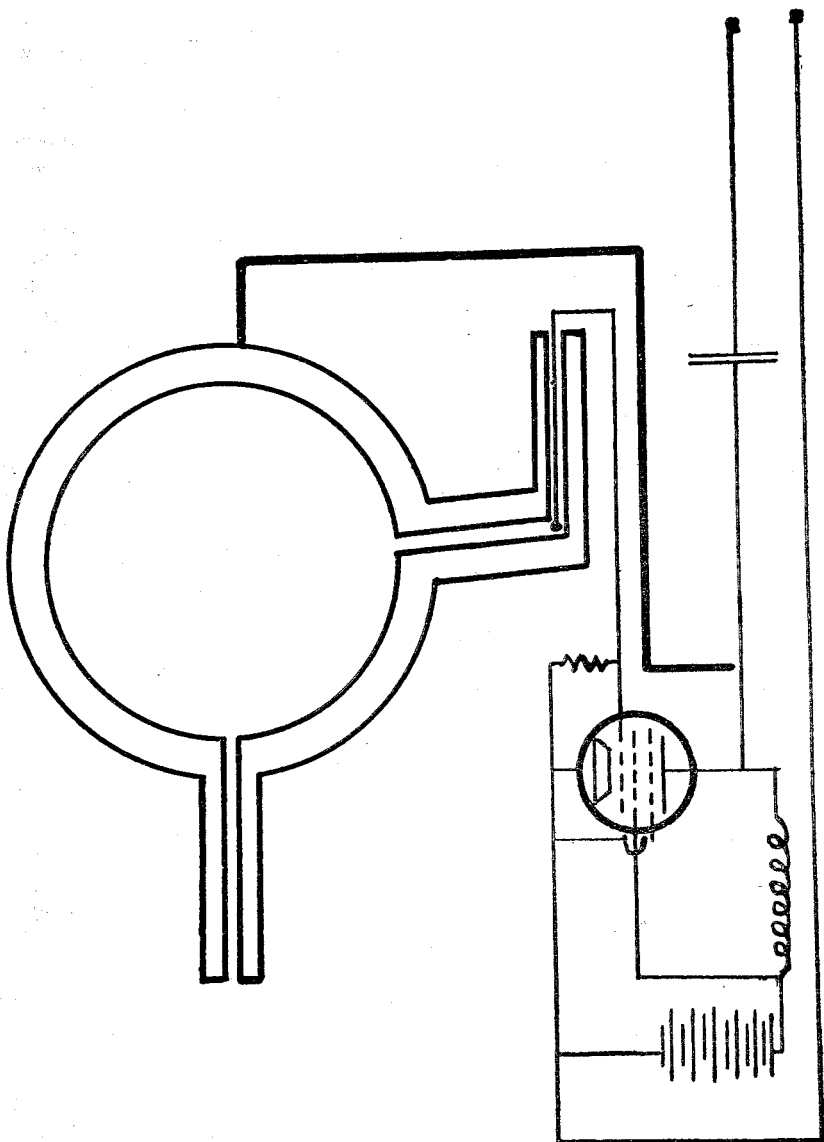
2. The dial-point found in this way is one which has been repeatedly found by other individual volunteers.

Among those who get response, Dr. Gotthard Gunther is typical. He is a philosopher; his special fields are the Metaphysics of History, and non-Aristotlean logics. (He is also a licensed stunt glider pilot, and a licensed ski instructor—anything but a narrow-minded specialist!) When Dr. Gunther first saw the device, he knew I'd been working with the Hieronymus machine, and was told only that this was a simplified and improved version. He tried it, and got the 45 response.

He then looked away, turned the dial well back toward zero, and retuned. Forty-five again. Again he turned the dial back, and again tuned blindly; 46. Then I opened the box and showed him what was inside. After considerable discussion centering around "fantastic" and "unbelievable," we put it back together, and he tried tuning again. He got 45 again.

The only way I can group those who do and those who do not get

This is the circuit diagram—and should be usable as a true, genuine printed circuit! Suggestion: cut out the page, back it with black paper, and have a photostat made. The page itself might not work by reason of confusion due to type on the other side. For the spiral coil: a circular spiral can be made readily by tacking paper on a board, and driving a medium nail through the center. Tie a thread around the nail, fixed against slipping. Insert a drawing instrument or ball-point pen through a loop in the end of the thread. As you draw "circles" around the nail, the thread winds up, and produces a uniform spiral track.



UNPROVABLE SPECULATION

response, so far, is to observe that children under fifteen almost invariably get repeatable response, while professional research scientists have, so far, a clean one hundred per cent no-response record. The normal interpretation of this would be "Children are, of course, easily fooled, but professionally trained careful observers cannot be deluded so easily." That is, of course, one hunch as to the significance of the data. But there is an alternative, and the hunch I have runs this way:

No instrument capable of responding has yet been invented—and that's not for want of trying. A lot of people have tried most assiduously. Naturally, an instrumental detector is wanted; it hasn't been achieved yet simply because we don't know enough about what the forces involved are. Human eyes were detecting light in scientific experiments for a good many millennia before light was understood well enough to make photoelectric cells possible. Instruments are highly desired; they don't exist.

But why is an instrument so desirable?

Primarily, I think, because an instrument makes possible complete, or nearly complete, separation of the *sensing* function, and *interpretation* function. Artists had a terrible time developing the principles of perspective painting. The Cro Magdon artists were doing excellent painting fifty thousand years ago—but it took nearly fifty thousand years to get to true perspective

painting. Reason: the human optical instrument, the eye, feeds into the optical center, where a tremendous amount of automatic evaluation and interpretation goes on before the conscious mind gets the results. If a friend stands three feet away from you, and holds his right hand directly toward your face, his right hand doesn't "look" five times as big as his left—but optical geometry quickly shows that it must be: Human sensory systems have enormously complex interpretive systems that stand between the sensing instrument and the conscious reception centers; the interpretations may conceal important factors. Hi-fi music addicts can vouch for that, too. Human sensing systems are not to be trusted fully, because they're too sophisticated; we need the raw data, sans "corrections," modifications, or interpretations.

A photoelectric cell is completely unsophisticated; its data is reliable because it totally lacks judgment. The more interpretation is built into the instrument, the less reliable the data-output becomes. A voltmeter is frequently used as a tachometer, by connecting it to a small dynamo and rectifier. If it is connected to a dry cell, it may read "300 RPM," even though the dry cell is not rotating at all. The interpretation is based on certain built-in assumptions which happen not to be applicable to the actual situation.

In view of this, my hunch is that children come closer to being re-

ASTOUNDING SCIENCE FICTION

liable sensing devices for this psionic work than any adult; they have less judgment, and far less built-in-by-education, assumptions to influence their interpretations.

As I say, with adults I've gotten the convinced mystic type that gets wild response all over the lot, and others who get no response whatever. A child will, of course, try hard to give the answer you hope for, where an adult isn't so easily influenced to do so. But if you take the precaution of deliberately and specifically misdirecting the child's expectation, and then get the repeatable response, the data seems reasonably useful.

Of course, it could be the children have been reading my mind, which means I'm getting awfully sharp at projective telepathy.

I have not the foggiest notion what the dial readings mean; that is an area I haven't undertaken to investigate. It may mean that my little standard test bar is "dense, soft, and metallic," or that it is "lead, tin, and antimony," or that it is "six inches by 1/2 inch by 1/3 inch." I do not know what it signifies; at this point I am not concerned with that real and no doubt important factor. I have other problems to investigate first. Anyone interested can set up the equipment and try determining for himself. There's an infinite number of experiments that could be made; I have long since resigned myself to the fact that I, individually, can't

exhaust infinity, and I'm not trying.

The circuit diagram is a very interesting business indeed. There are certain India ink lines which are "opaque insulating material," and there are other India ink lines, drawn with the same ink, using the same pen, at about the same time, on the same paper, which are "electrical conductors." And this is so because I said so, and for no other reason whatever! There are two lengths of nylon thread—from the wife's sewing basket—that connect the upper part of the circuit to the spiral coil; these are "electrical conductors," because I said so.

We are working at the level of pure symbolism—and a symbol is what it is because it is defined as being that symbol. This fact makes the behavior of a symbolic system completely violate the basic laws of physical science; no object need have the same characteristics for any two observers!

I'm working on this purely as an amateur, enjoying a hobby. But I can't help wondering about the implications of some of these findings, if my hunches do, in fact, have validity. Apparently, this system of pure symbols has repeatable effect on individual human beings who are not aware that there is solely a symbolic system back of the black bakelite panel. If it be true that symbols have real effect on human beings, even when those symbols are not known, then the implications in psychology and the humanic sciences are fascinating. People have, for

millennia, growled about the stupidity of human beings in reacting to symbols; politicians have been acutely aware of, and used, that fact.

Maybe it isn't stupidity? A moth isn't "stupid" in flying around and finally into, the candle flame; his neurological design is such that he is inescapably phototropic, and can't possibly avoid that behavior. Maybe human beings are, actually, symbol-tropic, and quite incapable of non-response to symbolic forces?

Symbols exist—have reality—only at the subjective level—but maybe the "subjective level" isn't simply something internal in each human being, as has been supposed?

And, of course, ESP, and psi phenomena, it is quite apparent, are subjective phenomena. At what other level would you expect to find telepathy? My hunch is that the correct approach to the problem of psi is precisely that Dr. Rhine has worked with—pure symbols.

By the way; a number of readers have asked for "ESP training devices." My investigation of the people who have worked with the psionic devices such as the Hieronymus and other gimmicks, shows an interesting trend. People who have been at it for a number of years, use the devices less and less. If the operation of the device is purely symbolic, pure relationship—why shouldn't one set up a relationship pattern among the neurones of the brain that can do the job as well?

But it evidently doesn't happen in weeks, and doesn't happen suddenly. The men who have developed the ability have worked for it, and worked hard over a period of years.

Finally, I repeat: I am offering the hunches of an amateur, and an account of some amateur experiments. I am not an authority, and do not pretend to have Truths or Campbell's Law, or anything of the sort. No one is paying me as a professional psionist, and I don't want anybody to; I'm not competent. But until I do claim that competence, and you are willing to pay me for that competence, you must, in justice, recognize that I am not compelled to defend my hunches, or perform any experiments *you* think I should perform. If there are experiments you want done—do 'em. You're as good an amateur as I am.

My hunch that this field was worth investigating, however, I can state with absolute conviction and authority, was valid in full. Proof of its validity is deductive and goes as follows:

1. It cost me about \$2.50 to build the machine in the photographs.
2. It took about four hours.
3. I've had hundreds of hours of Grade A bull-session discussions resulting from it, and enjoyed immensely exploring the unknown area.
4. What do you want for two and a half bucks?

JOHN W. CAMPBELL, JR.

THE END



THE MAN WITH THE CORKSCREW MIND

He was very sure that a telepath was not a "man with a corkscrew mind" who could drag ideas out of another man's head. And he should have known; he was a telepath himself. But..."should" isn't "does"!

BY STANLEY MULLEN

Illustrated by Freas

THE MAN WITH THE CORKSCREW MIND

71

"Remember me," the voice said. "Remember me, remember me, remember me?" The same words repeated over and over, the sound between a bleat and a whimper, sometimes a question, sometimes not.

It came like words forming in your brain. Or like bodiless voices, like thought-images, or occasionally like symbols which seemed to have distorted meanings. You could not reach out and connect with them, but if you relaxed, thoughts came through to you. But you have to be in just the right receptive state, he told himself. Then, if your own thoughts and emotions do not get in the way, you start receiving.

In the ward lights went out promptly at nine o'clock. It was like the army, but worse. Like both hospital and jail, and you never knew whether to consider yourself patient or prisoner. There was dead-ly routine and monotony, no privacy of any kind, just bleak surroundings and blank faces, food which might be nourishing, but was certainly nothing else.

They took away your watch and billfold, your keys and knife and any other small tools and necessary niceties. They provided for you, after their own fashion and on their own terms. You ceased to be a whole and responsible human being when they took away your sense of identity. You were just a fish in a bowl, with other fish around you and a world of staring fishy eyes outside the bowl—the eyes studying

and weighing your personality and finding it wanting in the essentials. You wondered what kind of scales they used, and how the brains behind the staring eyes expected to discover anything about the real you in such unnatural surroundings.

You felt little interest in the other beings who shared your unhappy state. Even trying to remember that you were supposed to have an interest in them became difficult. Though they were all individuals and different, they all seemed alike, and you realized that to outsiders you, too, would seem indistinguishable from the others.

It was worse than prison, for there at least all issues were clear-cut, with you and the rest like you on one side of the fence, and a world too easily convinced of your wrongness on the other. Here, even if you were not convinced of your wrongness, you soon would be. The rest of mankind had set you temporarily apart, and you waited, waited, waited for society to make up its mind about you. That was the normal order, of course, but for you it was different. Like all the others you were certain that you were here for a special, mystical purpose, not by default, or because you were suspected of mental deviation.

But even that might be a delusion.

The place was full of delusion, and you were part of it. How could you be sure that you were set apart? How could you be sure that **THEY**—that common term for the ab-

stract and mysterious beings who run things as they are—had not simply mousetrapped you? They came with their wild tale that no child in a civilized world would believe, and expected you to perform this idiotic mission for them, and because of one pressure or another, you went along and believed the yarn. You landed here, and here was nowhere, and the shadowy creatures around you were nothings.

Thought back upon coldly, in such surroundings, the whole project was insane; and since you were, reluctantly, part of it, you were probably insane, too. You could explain it to yourself, try to follow out in detail what had happened to you, but try to analyze it, or believe any part of it, and you were cooked.

THEY came to you. THEY stood in your quiet study and talked to you. And saner men than you have been locked up for believing a lot more believable things.

THEY came to you and wanted to know who you were, and if you could prove it, then how and why and when and a lot of other screwy approaches to undermining your confidence in yourself and your identity. It was some satisfaction to remember that you had turned the tables on them, that you had asked for their cards and credentials, and had made phone calls to the right government agencies, and made them stand right there and wait while you took time to check on them thoroughly.

"All right," you said warily, glancing from one to the other of THEM and reflecting uneasily that an announced drop-in by a pair of government agents might be a prelude to serious trouble. "All right, gentlemen. I'm convinced you're what you say you are. Now what can I do for you?"

So THEY reversed the ritual on you, to put you in your place for doubting their credentials.

"First," answered the younger of the pair, "you can try convincing us that you're Emmet FitzGerald."

Our civilization thrives on suspicion. It is taken for granted that a man without sixteen identification cards, a driver's license with fingerprints, a bank-signature record, and four copies each of front, profile, and three-quarter photographs is a solar myth. You not only have to be yourself, but be able to prove it to a bunch of bureaucrats on demand.

FitzGerald laughed, but THEY did not even smile. THEY never smile. Humorless types, these two, possibly from seeing too many G-Man movies or TV shows. Fitz shrugged wearily.

"Driver's license." He slapped the card-folder on the desk. "The prints could be faked, of course." He reached a copy of his book from the shelf. "There's a glamor-type photo of me on the jacket. I suppose I could write you a check and the bank would pay out the money, but that would take a little time. Have you any other suggestions?"

The younger agent whose name

was, Southey asked glumly: "Do you mind giving us a print to match this one on the driver's license photostat?"

"Would it matter if I minded?"

Fitz inked a fingertip and smudged a print on a clean sheet of typing paper. Lamont, the older frozen-faced character, snatched up the paper and held both old and new prints up to the light, comparing.

FitzGerald leaned back in his chair and studied his visitors. Nothing to learn from their faces. And he was in no mood to try for contact with their minds, which in any case would be professionally trained to blankness.

Southey glanced up sourly from the dust-jacket photo.

"Doesn't look too much like you," he observed.

"They never do. Retouched and glamored-up. People seem to expect writers to look like writers. Do you imagine for a holy minute that anyone would be masquerading as me?"

"It could happen."

"That's not a recent picture. A friend of mine, guy I knew in the war, became a camera fiend. I was handy, and he took a lot of casual mini-cam shots. Really candid, some of them."

"We've already checked your army records. And other records. This is just a formality."

"Why be formal? Why be polite at all? I gather that this is not a

social call. So what happens now? Do I call my lawyer, or what?"

"Don't bother, unless you want," said Lamont. "The prints check. I thought they would. As for your lawyer, we've already called him, made certain arrangements. You did write the book, 'The Mature Telepath,' didn't you?"

"Of course I wrote it. No ghosts. No nothing. Just me and my little typewriter. Is it against federal law to write a serious non-fiction study of telepathy?"

Southey almost smiled, but not quite. "It might be if the politicians ever heard about it. But so far, no law that I know of. Are the statements you made in that book true? Literally true?"

FitzGerald's first wave of fear had subsided, only to be replaced now with a flash of artistic indignation.

"Literally true," he stormed. "If you had bothered to read the book, you'd know that the appendix contains photostats of notarized depositions, by me, and by several noted scientists who witnessed demonstrations. Men whose professional and personal integrity are beyond question."

Lamont said quietly, "In that case, we are here to consult you professionally. Your profession, not ours. We need a mind reader."

FitzGerald contained his blazing anger, trying to answer calmly.

"I'm afraid I can't help you, gentlemen. The science of telepathy is too new and too erratic to be

acceptable evidence in a court of law. Besides, I wouldn't stoop to using my quaintly abnormal senses to spy on people's delinquencies. You have to find another quack to compare people's mental reservations with the statements they make on income tax forms. I never claimed to read minds."

"What, exactly, do you claim?" asked Southey.

"ESP, or Psi if you prefer, is merely a study of certain abilities of the human animal not accounted for by the five senses which are obvious and acceptable to science. Telepathy is only one of these talents which I believe to be latent in the human race. Some individuals have this potential ability more highly developed or more sensitive than the average. But there is nothing mysterious, supernatural, or abnormal about it. Everyone has the powers and perceptions grouped under the terms of Psi, but most people are too dull, stupid, or lazy to use their abilities or even be aware of them."

"But you can use yours?" The pressure again.

"Within limits. Nothing suited to cloak and dagger stuff, I'm sure. I don't read minds. I don't think anyone does. The general public seems to imagine that a telepath's mind is a kind of corkscrew, pulling out corks and letting the thoughts pour forth, drinking up thoughts from anyone as it strikes his fancy. It's nothing like that. My brain, or yours, is a sensitive receiving instru-

ment. Other brains may or may not be transmitting. At best, and only rarely, I can receive vagrant thoughts from another person. Usually only fragments of thoughts, and often nothing that makes sense to me. What I think someone is thinking is not evidence. That is what I claimed, and all I claim."

"I see," commented Lamont. Southey nodded dubiously.

In character, they were silent, as if thinking long, long thoughts, a leathery, thin-lipped, prosperous-looking pair, like a couple of well-off lawyers, or just errand boys for the government which they claimed to be.

"Maybe a real live mind reader is more what we had in mind," said Southey, breaking the silence. "But it's possible you can help us anyhow." He glanced at his partner as if for a suggestion how to proceed. Lamont shook his head, then appeared to reconsider. Both acted as if feeling their way on unfamiliar ground.

"I'm not sure I care about helping you," said Fitz sharply, "even if I could."

"Don't be hasty about that, Fitzgerald," cautioned Lamont. "We got off on the wrong foot with you. But in unusual situations, you have to use unusual methods. We had to be extra careful about your identity. For a good reason, but I'm willing to apologize for that. We have a situation we're not geared to handle. Maybe you are. If not, we're no

worse off. I'll lay it on the line for you. We have a cold trail, and we'd like you to have a try at warming it up for us."

"I'll listen, but no pressure."

"No pressure," agreed Lamont. "You tell him about it, Southey. You were there."

"Right." So without preliminaries, Southey plunged in.

"Our investigations of you, FitzGerald, show that you've read science fiction. In that case, you won't be shocked by the mention of a spaceship, and the possibility of an alien from outer space."

FitzGerald grinned suddenly. "Not shocked, no. But a good deal less gullible than the man in the street. I know how unlikely such a possibility is. I've never heard of a science-fiction fan being scared by that Orson Welles radio broadcast of Martian invasion. When you know the stock plots, and know the mathematical odds against intelligent life on other worlds—"

"I'm not talking about mathematical odds, or imaginative fantasies. I'm talking cold, hard, unpleasant, frightening facts. We have the spaceship. We know that an alien form of life lived through a crash landing of that spaceship. We know he is loose, hiding out, right here on Earth. We don't know where he came from, or why, but we know roughly what he is like, and we think we know where he is. There may be more than one, which complicates the problem, but if we can put our finger on one,

that will help. He can tell us something about himself, and what his intentions are, whether he wants to or not."

"I see," FitzGerald commented soberly. "But I notice you said we 'know' these things, instead of the usual we 'have reason to believe.' Is it as positive as that?"

Southey's face set slightly, as if he had told the story and been disbelieved before.

"The evidence is real enough. We have the spaceship, and everything about it baffles experts. The alien has been seen and described to us. First, as a man in a weird kind of suiting like a spacesuit, transparent dome and all. Then after he had rid himself of the suit as a man whose actions were odd enough to attract attention. He acted crazy. He left a trail a blind man could follow. And when he went into hiding, he picked a place that was perfectly logical. We 'have reason to believe' that our alien is in Fairbridge General Hospital, in the psychopathic ward."

"Why don't you pick him up then?"

Southey sighed. "We don't know which patient he is—the trail is cold. Nobody believed the reports at first, so our agents were called off too soon. It does sound crazy. Even the people who saw the guy in the spacesuit thought he was advertising a current shocker movie. You could march green dragons up and down Main Street anywhere, and nobody would turn a head if

you put signboards on them. But that spaceship. *Whew!* I've seen it, and the thing scares me—"

"Couldn't it be a fake, a mock-up of some kind?"

"Couldn't be. Experts say there are alloys of metals not found on Earth. Technical gadgets that work, and we don't know how. And there's a general feeling and aspect of authentic alien-quality I can't describe, though I've seen and felt it. I know my emotional reaction is not evidence, but—"

"There's been nothing in the papers. No broadcasts."

"Did you think there would be? We'd have a real panic if we dared hint what we know. Some facts did get out and got printed, but we keep a staff of tame experts to laugh them down. So the hardened and

cynical newsreading public is convinced that this new rumor is just nonsense. Human inertia is a wonderful force, except when you're trying to work against it. How many people believe the stuff in your book?"

FitzGerald smiled ruefully. "Not many. I don't have enough alphabet soup in my academic background to get a hearing from serious scientists. And nobody really wants to believe in telepathy. If you confuse it with mind reading, it's too embarrassing. But that's my problem. I'd like to hear more about yours. What about this alien? I would expect a little green man from Mars to stick out like a sore thumb. What kind of monster is he?"

"Worse than a monster," admit-



ted Southey. "Apparently he looks just like us. Enough to pass as human. Enough to lose himself in the passing throngs of humanity."

"That's not too surprising. There's a definite school of thought that intelligent life would develop along the same or similar lines wherever conditions made life possible. The human form is fairly efficient, especially the hand with four fingers and an opposed thumb. And it may be that a carbon-jelly biped is a major goal, or an important way station, with the blueprints for it inherent in the material. Of course, the mathematical possibilities are infinite, and different conditions might produce totally different reactions to them. You could get the protoplasm shape-changer who was a standard character in the horror tales."

"We're not interested in theories, FitzGerald. The fact is, the alien survived. Somehow, he adapted to conditions on Earth, if he had to adapt. He's among us now, a greater potential menace than the cobalt bomb. We have to hunt him down."

"But why come to me? Surely you don't think I'm your alien—"

"I wish it were as simple as that. Actually, we want you to smell him out for us, if the term applies to faculties you claim you have. If you can sense his mental images, thoughts or words, symbols or even nonhuman memories, you could point him out to us. That's all we ask."

FitzGerald hesitated, thinking hard. He hesitated.

"It's a great deal to ask," he said slowly. "We don't know that his mental or physical processes are any different from ours. If his body is enough like ours to fool anyone, his mind may be enough like ours to fool me. And a simple course of mind discipline would make him a closed book to me. I can't reach in and probe for what I want. I can only catch the overflow, and that only if he is not aware he is transmitting, or is consciously trying to get a message to me."

Lamont shrugged. "This is not a game to us. It's a deadly business. We think we know where he is. We don't know what he looks like, because he looks so much like one of us. The ordinary, individual differences don't matter, because we all have some. Even his peculiarities and slip-ups won't show, because he has sense enough to hide in a place where screwball behavior is normal. The mental observation ward of a state hospital. We're either dealing with a shrewd, dangerous character, or accident is working overtime on his side."

"Wait a minute," FitzGerald argued. "People don't just apply for admission to a nuthouse. How did your alien manage to slip in a place that's locked inside and out? He might as well try to hide out in the Mint."

Southey flushed. "That was our

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mistake. Nobody believes in ghosts. Or in spaceships, or alien spacemen. So we ran into official blockades and red tape. By the time somebody who gives orders got convinced, the trail was cold. We've had an army of men out, questioning everyone, checking backgrounds. The best we could hope for was to round up all the possibles, then start eliminating. We've done that as well as possible. But time had passed. We've run down the most fantastic leads, and traced nobodies back to the gleam in their parents' eyes. And eliminated all but five men who were picked up during a three-week period in the state capital."

"I get it," gasped FitzGerald. "All five are men who just happened to get caught in the butterfly nets."

"And all five are men without histories. Derelicts from Skid Row. Possible criminals who have covered their pasts. Maybe men who really don't know or care who they are. Four of them are human, and the fifth—"

"May be something else."

"Right. Will you help us, FitzGerald? It'll be like a police lineup, four innocents and one man to be identified. We can have you thrown with them, as another patient, so as not to put our alien on his guard. You can study him and the others and reach your own conclusions."

"I don't know. It's all so fantastic."

"No more so than that spaceship.

I've seen it. There's nothing like it on this world. Maybe you can make a real contact with him. Find out who he is and what he wants. Where he came from, how to operate those gadgets on his ship. Interested?"

FitzGerald whistled. "Interested, yes. But scared, too. You don't know what you're asking. I've stayed clear of crackpots, because off-beat thoughts get me all scrambled mentally. I don't know what a session in a laughing academy with real lunatics might do to me. If I made contact, the images and impulses might not mean anything to me. And again, they might tangle me up so I could never straighten out. Let alone what a contact with a truly alien mind could do. There's only one reason I'm considering it."

"What's that?" Pressure again.

FitzGerald laughed bitterly. "I'm thinking that an alien might be just a harmless tourist, or a cast-away spaceman who wants only to get home. What then? If you catch him, and your boys work him over, it will be pretty nasty. Imagine a shipwrecked sailor among cannibals and you'll see what I mean. His friends could come for him, and they might not like what they found."

"We're just doing our job. We have to find him and ask some questions, that's all. If you won't help us, we'll have to work over all five of them, or figure out some better way. And none of them may be the alien. If you prefer it that way, suit yourself. It's still a free coun-

try, and we can't force you to cooperate with us."

FitzGerald's eyes narrowed. "It's a free country, and I'd like to keep it that way. You just forced me—"

"Let's go," said Southey. "We'll give you three days."

FitzGerald grimaced as he jerked the unfinished page of his new book from the typewriter and crumpled it. He wondered if he would ever have a chance to finish *Opus II*, and if it would matter whether he did or not.

"Just like that," he muttered. "Not even time to straighten out my affairs. Not even time for thinking about it, or wondering—"

Lamont thawed slightly. "As the man said when shaking hands with a tiger, 'I don't mind giving you a hand, Bud, but I'd like to be sure of getting my hand back.' Don't worry, FitzGerald, we'll give you all the protection possible. There's a doctor who knows all about this. Allan—"

"Let's go," FitzGerald said unhappily, wondering what new and eerie material he would have for his next writings, if he had a chance to write again. Wondering—

It was the second night, late. Very late. You sensed the others around you, the heavy breathing, the restless tossing, the creak of beds. Someone is actually asleep, for there is audible, insistent snoring, and that vague flickering in your brain which is another's dreaming. But the others, like you, lie there

quietly, staring at darkness, thinking, or trying not to think.

A guy could go really nuts just thinking about it.

Or just thinking. Brain-weary, you refused the struggle and settled back into a comfortable state of not-thinking. A kind of self-hypnosis actually, trancelike.

Relax. Just relax and lie there.

Thoughts come beating at you through the darkness, some on gauzy wings, others hammering. Thoughts. Their thoughts? Or did you just imagine in some other life that you were telepathic? That sometimes thoughts not your own came to you, unasked and often unwanted. You never knew quite where they came from, and out of context, thoughts of other people rarely made sense.

You could catch fragments here and there, like moths on the wing, but if you touched them, they crumbled into dust. They became dead and broken things if you tried to seize them and make them your own. But if you lay back quietly and let darkness seep into you along with them, you could enjoy their passing just as you might the casual patterns of luminous butterflies weaving meaningless abstractions upon the blackness.

Sometimes it was just emotion you sensed. A powerful emotion like thirst. No words, not even pictures, no image of a sticky bottle of rotgut whiskey, no cool and frosty glass of beer. No anything. But someone was caught in the grip

of terrible emotion. Thirst. Just thirst that was pure agony—bitter burning in the throat and a resined bow drawn squeakily across taut nerves. Body and soul screamed for a drink. Just a drink. A little thing to ask. Just one—

FitzGerald shuddered and tried to tune it out. But repelling an emotion from the mind is not turning a dial. He tried to withdraw himself from its agony, from its whining insistence. If your mind was sensitive enough, you were trapped. You tried in vain to escape. It was no longer just a message received across the never-never land between the minds, but a real and sharp and definite emotion of his own. You did not merely share the agony of thirst, the terrible impulse to limited self-destruction—it was yours. Nobody could be an onlooker with other people's thoughts and emotions, with their ideas and cravings and fears—you gave them the opening, and they moved in, took over. That was the penalty.

Other thoughts and feelings then. Crowding. Rushing out of their lairs, exploring, thrusting, conquering, invading his mind as if they drew both strength and courage from the darkness. By a conscious effort, FitzGerald withdrew from the mental melee. He concentrated his thoughts elsewhere, striving desperately to remain aloof and untrammelled long enough to get back his balance. In that jeweled second of withdrawal, it came again—

Suddenly tendrils of alien thought and feeling brushed against FitzGerald's mind. Really alien. Not bizarre, exotic. Not friendly. Not malignant. Not any emotion that could be named, identified, pigeonholed. Just a sudden twinge of feeling and thought that was subtly different. Something like a questing ghost, not completely sensed, then gone like a ghost, leaving an uncanny impression of distance and strangeness.

Knowing better, FitzGerald still tried to capture the fleeting sensation. But it was like snatching at a sunbeam, he could connect with nothing solid. Nothing as tangible as a real thought. Hardly even a flash of disconnected emotion. An idea of searching, of frustration which was not necessarily an alien emotion in such surroundings.

Baffled, FitzGerald tried to analyze his impression. What about it had been alien, what had he sensed not normal to his own kind? Unearthly suggestion, yes. But how, why, what?

Familiar things became suddenly unfamiliar. As if the everyday facts one took for granted had suddenly come alive, squirming out of grasp like a greased, rubbery doorknob as one reached out to it.

The everyday facts. But what were facts? Just the individual items in the pattern of ritually accepted lies and half-truths agreed upon by the society one happened to be born into. Everyday facts and everyday objects. What were those sacred ob-

jects? The feel of things you knew about you. A conspiracy of accepted and familiar aspects. But what did one ever really know about his surroundings? We admit, under pressure, that none of those familiar things are actually like what we think we see. Symbols, that is all.

And even the symbols, doubtful. We know that our brains see our surroundings only by a certain range of light vibrations bounced from them to us. We know nothing of their real colors, but only the colors of light falling upon them. And the science of optics tells us that actually we see our own world upside down—that our brains are habit-accustomed to turning it rightside up for us. Or maybe it is as topsyturvy as we see it, and our brains are just kidding us with helpful delusions. What is this real world, and how real is it? Why not just another unreal set of facts we agree to accept because we are taught that is the safest way? A tempering of reality into comfortable fantasy, or fantasy into reality.

How far can I trust my senses? The five accepted ones, and those borderline senses most people dare not admit they have? What are these senses, what is taste, sight, smell, hearing and touch, where does one leave off and another begin? My contacts with reality, and how reliable are they. Dealers in illusion, all of them, and illusion is the gateway to madness. In a mad world, no man is sane.

So substance, solidity, everything,

vanishes in a whirl of atoms, and atoms are reasoned away as dimensionless points of energy in space, which is only a word for emptiness and nothingness. Space around me. Space, full of dimensions and energies, full of forms and limitations, full of nothing, but with everything interlocked, co-existing, overlapping, piled together and hopelessly tangled, universes within universes, a boundless but limited nothingness, a pattern of lines leading into infinity. But when you reach infinity, where are you. Alone, as you were in the beginning. Alone, again and forever.

Alone, alone among madmen. Six of them, since you came. Your kind. Madmen. But still you are alone. FitzGerald wondered sharply how anyone, even an alien, could feel more alien than he felt. More alone.

He cleared his mind, blanking out everything, just as one clears a business machine to start over.

Start with a simple fact, he advised himself. Something you're sure of.

The darkness. Darkness around you. Stare into it and conjure up monsters of nightmare, dreadful things which cannot live in light.

Relax, and let the monsters at you. The monstrous thoughts and fears and cravings of the other madmen. For one of them may not be mad, and may not even be a man. And if you find out which is which, what will you do then? Call the

police and turn that lone and hunted thing over to a pressure group? Call in THEM.

Again strange tendrils brush against your thoughts, questing, exploring, hoping. Then, as you tense in repulsion and dismay, they withdraw quickly, quietly. Relax. Relax, and let those alien thoughts find you. Let them fall into your trap.

Once more, the contact, and—

A scream splits the silence like an explosion. A scream like a soul in torment. A scream of delirium.

That alcoholic again. The tattooed carnival man, in the throes of his delirium tremens.

Suddenly the darkness is full of movement. Of violence. A heavy bulk crashes upon you. Spinters of shock and pain burst in your brain, and run through your body like streams of colored fireworks. You wrench upward, fighting, heaving against the weight. Instinct, the ancient fear of a trap, of suffocation, fight with you. Grimly you struggle in the dark, avoiding the storming blows, the savage claws, striving to hinder and maim your assailant, getting some damage and doing some.

You jerk and wrench and heave convulsively. You feel the sideslip of your foe's body. Then still tangled, both of you hit the floor, falling, sliding, rolling. The weight is gone. You break free, fight to your knees. Free again. Free and alone. But now there is light. Light everywhere, a blinding, punishing glare.

Orderlies are there, helping and holding you.

Sprawled on the floor is a threshing, kicking thing, not a man so much as a wild animal caught by hunters, desperately trying to get away. It screams and screams, and the cry is that of a man screaming, not a beast, but still a tortured, hunted, hopeless thing. Its thoughts crash at you, and it is the wordless, formless, craving thought of thirst which you have sensed before. But the orderlies beat it down and hold it, and it works out its violence against them. It subsides, the force of thought dwindles as if going on and on and on into infinite distance, but the idea of thirst remains like a silent scream in your brain.

Then they take the quiet, limp thing away to poke the needles and drugs into it.

Another orderly—in prisons the inmates call them "screws"—looks at you as you might look at something in a zoo.

"Come on, you," he says in a voice which does not confuse invitation with command. "Doc wants to see you."

You stagger to your feet and stand tottering. "I don't think I need a doctor. I'm all right."

His laugh refutes your identity, your dignity as a human being.

"That's what you think, stupid. That's what you all think. There's nothing the matter with you. Come on. When Dr. Allan says come, you come. Understand?"

FitzGerald understood.

Dr. Allan was a short, stocky



man, with a fringe of thin gray hair, a weak chin, and a round face blank of expression. He could have been a comedy-relief character in a cheap movie, except for faded blue eyes which brooded calmly and coldly upon unpleasant things.

The doctor nodded to the orderly in dismissal, but the man lingered. "Sure you can handle this one, sir?"

Dr. Allan smiled sourly. "I don't think the patient will give me any trouble, will you, FitzGerald?"

FitzGerald shook his head and spoke out viciously, "When doc says go, you go. Understand, stupid?"

Glowering, the attendant retreated.

"Sit down, FitzGerald. I'm glad two days in this monastery of ours hasn't broken your spirit. Ugly business, isn't it?"

"Do you mean about the alien? Or the work you do in the hospital?"

"Both," Dr. Allan answered quickly. "There have been improvements in dealing with mental disorders, but it's still pretty bad. Never enough funds, pay scale too low to attract anything but thugs and sadists, the doctors try, but you can't do a good job with poor tools. About the alien. Are you having any luck at all?"

"I don't know," FitzGerald said numbly. "Several times I felt I almost had something. It was close, just before the ruckus started."

"Your friends outside were won-

dering. I've just had a phone call from them. I promised to call them back if you were doing any good."

"I'm not doing myself any good," complained FitzGerald. "I could just about qualify for admission here, for letting myself in on a deal like this."

"Sit down and relax. Pressure's off here. You hate pressure, don't you? Smoke?"

FitzGerald eased into the chair. "Yes to the first question. No, thanks, to the second. I don't smoke."

"Don't even talk unless you want to."

FitzGerald sat back and took in his surroundings. It was a real office, as real as things are. It might have been any doctor's office, anywhere. An unbarred window opened onto the green of manicured lawns, now a silvered and subdued pattern of moon-drenched planes and shadow-denseness. Real lawns. At least real enough to run upon with bare feet, feeling the tickle of grass-blades under the toes, the cool, pleasing dampness, the give and spring of turf. There was a world out there, a world of memories, of ordinary, uncomplicated people. Or were there any uncomplicated people?

"I don't mind talking," FitzGerald said, taking refuge in words. "It's just that I don't have anything to say."

"I've read your book, FitzGerald. Very interesting. Inconclusive, because of the subject matter. If I

were completely honest, I'd say your evidence would be convincing if your material dealt with any other subject. Training's against me. Training and feeling both. I can't accept telepathy, even if you prove it to me. In the last analysis, I'm afraid, science is as indefensible as superstition, and as bigoted.

"You aren't, or you wouldn't admit it. I can see your point, though. No scientist could believe in a ghost unless it had been weighed and evaluated in a laboratory under rigid scientific conditions. And no ghost would submit to them. It's a contradiction in terms.

"That gives it a name, but doesn't solve anything. The two agents who brought you here didn't really believe in an alien. They wouldn't if they saw one. They couldn't, even if he proved he was an alien. But they have to convince themselves they believe, because the evidence is too strong. Do you actually believe that one of those five patients is an alien?"

"I don't know if I do or not. As you say, I have to convince myself that I believe it, or I couldn't act. I guess I'm just playing along in the hope of convincing myself it isn't true. How about you, doctor? Do you believe it?"

"Frankly, no. But I'm just curious enough to go along with the experiment. Like those government agents, I have to know if someone landed here from a spaceship, but for different reasons. It's an up-to-

date variant of the old shell game, isn't it? Under which nutshell is the alien. One of five. Which one?"

"You guess," suggested FitzGerald.

Dr. Allan shrugged. "Two alcoholics, two schizophrenics, and a catatonic. How about one of the alcoholics, maybe the one who just got violent and attacked you? He could have realized you were a spy, and potentially dangerous to him. A mind-spy. He may be a better telepath than you are. Who knows what he may have read in your mind?"

FitzGerald grunted. "Who knows, if he read my mind? But I don't think he did. I read his, and there wasn't room in his brain for anything but thirst."

"If he's a true alien, he might have power to impress whatever thought he liked on your mind. But you're doing the picking, by government request. Who's your candidate?"

"I'd vote for the catatonic. Since he was brought here, he's been curled up in a ball. He doesn't talk, he won't eat unless he's fed forcibly, he doesn't do anything. It's a perfect set-up for an alien."

"Our alien might not need that. If he's advance man for an invasion, he'd know the language and have all the papers like any other spy. Imagine learning a language from monitored TV and radio programs. I shudder to think what his ideas of our civilization must be."

"It will be worse before he's

through with us," said FitzGerald grimly. "They'll find him, and pin him down, before he can put the finger on us. I don't like to think what they'll do to make him talk. I'm trying not to think as far ahead as that. Trying not to think at all—"

Dr. Allan studied FitzGerald closely. "If you want my advice, you'll shed that hair-shirt the hospital issues. Put on your own clothes and go quietly home. I'll tell your government friends it was no good. There won't be any trouble."

"No trouble," brooded FitzGerald aloud. "I'd like that. I'd like to go home and forget all about this. But I can't. I don't know why. Maybe I'm curious, too. Maybe I am scared, down deep. And maybe I feel responsible to the alien."

Dr. Allan stood up, shaking his head soberly. "I wish I could make it easier for you. But that would defeat your whole purpose here, wouldn't it. I guess you'd better resume your vigil, then. Get it finished, one way or another. I'll walk along, and see you safely back in the pressure cooker."

Footsteps echoed before them down the long, empty corridors. At night, the hospital seemed oddly deserted, just an abstraction of polished planes, repeated rectangles, light splashes at regular intervals. The corridor extended endlessly, a pattern of lines reaching out toward infinity. Behind each door was

a pattern of mind and emotion, all spaced like units of a vast, complex design, all troubled and uncertain and lost, each convinced of its own uniqueness and importance, each reaching out like the lines toward a dim infinity, but without conviction, without hope.

FitzGerald sensed about him, behind the myriad doors, a tangled skein of many thoughts, tenuous impressions of many personalities. He sensed people behind the doors, and other people behind each of those, like a terrible counterpoint of the linear motif. Everything, everybody, extending in all directions away from him into infinity. He alone, lost, without either lines or other people's emotions binding him to that unreachable goal.

The patterns dissolved around him. There was commotion in the corridor. Sudden, shattering violence.

From somewhere, from behind a door that should have been locked, or perhaps had been forced, burst a flailing figure. It ran, crouching low, bowling over the assembled opposition of nurses and orderlies like tenpins. It crashed against the doctor and FitzGerald, pinning them together, entangling them in its violence.

The tattooed man, the circus or carnival character, the frenzied alcoholic.

And his mind recalled the quivering, tortured dominant of thirst—

A knife appeared, threatened. A glittering fan of icy reflected light

like a juggler's toy. It pressed hard into the doctor's white jacket, but did not drive home. A hand, inhumanly strong, caught FitzGerald's wrist, wrenched it behind him, twisted. He was propelled bodily backward into Allan's office. The door crashed shut, and the lock clicked.

The tattooed man hurled FitzGerald into a corner. Dr. Allan was arched painfully across his desk while the knife puckered an indentation in his throat. A drop of blood formed around the point.

"Keys," demanded the tattooed man hoarsely.

He snatched the ring of jingling keys and began rifling the desk. In the second drawer he found the gun.

FitzGerald broke the spell of inaction that held him. Like a springing leopard, he flung himself. The gun swept up. Gunsight shredded FitzGerald's lip. He felt teeth break, and reeling backward, he saw the gun swing to Dr. Allan. Bloodshot eyes squinted meanly.

"Don't make me shoot," the man warned.

"What do you want?" asked Dr. Allan calmly.

The tattooed man laughed. "We're leaving here. All of us. All three—"

"You'll never make it," said FitzGerald, lisping through pulped lips.

"Yes I will. Don't you want out of here?"

"Of course."

"For a minute, I wondered whose side you were on. He'll go with us—partway. With a hostage, we'll make it."

"You can't run away from trouble inside yourself," said Dr. Allan softly.

"Don't talk. Move." Grimacing savagely, the tattooed man waved his weapon, shepherding his captive doctor toward the window.

The ground was a short drop away. Outside was freedom of a sort.

They set off across the neat lawns and into shadowing brush. The tattooed man set a stiff pace. FitzGerald, retching and spitting tooth-splinters, had trouble keeping up. They moved through bushes which slashed at them, under dense cover of trees, along broken cement walks, across open vacant lots. Above the distant spatter of city lights was a faint smear of luminosity, and about them cloud, troubled moonlight. Wind, cool and restless, stirred dry leaves to rustling.

FitzGerald felt painfully the idiocy of the project and the sheer insanity of their costume for it. He idled hopelessly with the thought that he lay on his bed, half-asleep, caught in a web of his own or another's dreaming.

But the dream continued, flowing about him like a film montage. Except that the solid ground underfoot was real, and the caress of wind felt like cool fluid on his fevered skin.

"Hurry up!" ordered the tattooed man.

"Hurry up—where?" FitzGerald demanded.

"You'll find out."

Tranced, FitzGerald stood by while the madman smashed a window from a parked car and rigged a jumper to the ignition. With FitzGerald at the wheel and Dr. Allan cowering beside him, the tattooed man lolling in the back seat and commanding by gestures with the gun, they took off.

Streets streamed past. In the distance, there were sirens, but no visible signs of pursuit appeared.

"Faster," said the tattooed man.

FitzGerald concentrated upon driving. In grim silence, they threaded mazes of darkened streets, taking less traveled thoroughfares and cutting through alleys. Ahead, linear perspectives took form, lines, everywhere moving patterns of lines, all leading away toward infinity. And this time, at a madman's whim, to the darkest, most unknown infinity.

"Stop here!"

FitzGerald dragged the car to a stop, brakes and tires screaming.

"Get out, both of you."

The madman followed them from the car. In a second of frozen horror, FitzGerald guessed—

"This is as far as we go," said the tattooed man.

"What are you planning to do with us?" asked Dr. Allan.

Grinning, the tattooed man raised the gun. "I'm trying to make up

my mind about that. Since you've jogged my elbow, you first. Start running—"

Unbelieving, the doctor took two backward steps, sagging as if the starch had run out of him. Then he turned and began to run, awkwardly, pitifully, a perfect running target. The madman aimed carefully.

FitzGerald moved, striking at the gunhand, standing in the way of the shot, grappling.

Memory flooded his brain. Not full memory. But he knew his most powerful weapon—his brain. He struck out with it, with the full force of mind.

And encountered steel. Pain burst explosively through him. Pain and partial awakening.

The tattooed man, laughing, threw away the gun.

"I was beginning to wonder if you were worth the trouble," said the tattooed man.

"Who are you?" asked FitzGerald. "What are you?"

"You still don't know? You wanted an alien. Well, you've found one. Do I come up to your expectations?"

FitzGerald shook his head in wonder and horror.

"Why did you want to kill the doctor?"

The alien smiled. "I couldn't kill him, and I know you couldn't stand by and let me kill him. I wanted to shock you and get past your guard. I couldn't be sure."

"Sure of what?"

"Sure about you. There's something poisonous about this planet. Mind-warping. Not chemical, of course, we had tested for that. But you can't test psychological effects. Not without the right kind of guinea pig. Something here on Earth twists a mind until you imagine you belong here, that you're of the native species. It did that to me, at first. But I'd been conditioned, posthypnotic suggestion, so I recovered fast. I knew who I was, and why I came here."

"Why are you here? For conquest? As a spy. Back in the hospital, I sensed alien thoughts. But those wild, desperate thirst cravings of yours blotted out everything."

The alien laughed. "Yes, thirst. You received only what I wanted you to receive. There was thirst, but it was only a thirst to get back home, where I belong. Where we belong."

"I?"

"I was the alien you were looking for. You were the one I had to find. Those in the first wave, like you, were not conditioned to remember, as I was. We did not know the danger then. You actually believed you were one of them, and you fit in so perfectly we could not locate you. We dared not risk hunting too openly. These humans are dangerous—"

"You don't know how dangerous," FitzGerald burst out. "They could never live side by side with another species. They have their

fatal pride and dignity and greed, all based on fear. They don't know how to live and work together for mutual advantage, not even with each other. With us, they'd have to rule—or it would be a fight to the death."

"We wouldn't have hurt them. We couldn't have. But it's just as well we found we can't live here. Too bad for them, though, but I don't think we could stand such neighbors."

The alien stumbled, half-falling. FitzGerald caught and held him.

"I've got to get back," came the thought. "This wretched synthetic body. Good enough to fool them, but . . . not good for much else. This world does something to us. I'm sick, and all mixed-up inside. They'll fix me up—when we get home."

A terrible thought struck FitzGerald. "The spaceship . . . they've found and dismantled it . . . it's gone—"

Terror blazed through him as he realized the trapped feeling in himself. Trapped, on an alien, hostile world. Today and yesterday they had been hunting the tattooed man. Tomorrow, he would be the quarry.

Swiftly came the reply, without need of speech. "They'll be hunting us, yes, but they won't find us. They were meant to find what they found. A fake, a mock-up spaceship. We built the false ship and led them to it. Bait on the trap. Since we could not locate you and could not look

openly, we made them bring you to us. We knew you would be telepathic, and not know any better than to reveal it."

"And all the time I was among these people just to betray them? I feel like a Judas goat—"

FitzGerald looked down at his arms and legs in the fretted moonlight. He tried to imagine his remembered face in the mirror. He wondered what he was really like, what kind of alien monster—

Laughter jeered in his brain. Knowing that the Other shared his thoughts at will, FitzGerald stubbornly persisted in trying to rebuild nostalgic impressions of the world he had known and believed his own. Briefly, memory touched a myriad of minor fragments—moonlight shining through clouds, wet streets after a rain shining like black oilcloth with light lying about in splashed pools, the smells of city and country, sounds from the roar of traffic, a sudden sharp awareness of bacon-smell and the aroma of coffee, the sigh of wind and patter of rain, the silence of snow—

"Small magics build a world, not the great, remembered movements of history," thought the Other, unsmiling.

Patterns. Patterns dwindling and fading away, and the sadness that such magical things had lost meaning.

They were in a tiny park. Trees parted before them.

"Not here, surely," FitzGerald's

mind protested. "Not right in the city. No spaceship—"

"You'll have to start thinking in other terms," chided the tattooed man. "And, please, not so violently. Who uses spaceships?"

Patterns shifting and rearranging themselves. Atoms and universes. Space. Lines leading away into infinity. Into a new infinity in which he might have a part.

Not a spaceship. Not big, metallic, mirror-bright and needle-shaped, as he had imagined. Not anything he had a name for. A luminous

framework, a hodgepodge of geometric patterns, a glowing, translucent phantom of webbing, half-seen, half-sensed with some other un-earthly sense, a contrivance enclosing space.

Enclosing and transcending space. Enclosing and transcending time. Lines leading—somewhere.

Leading home. Nostalgic fragments began to come to him, remembered emotion and expanding joy. He was going home.

Remembering—

THE END

THE ANALYTICAL LABORATORY

All things considered—things like the way novel instalments consistently score high in the Lab here, and the way Ike Asimov consistently scores high—the first-place winner probably isn't a great surprise. But here's how the November issue scoring came out:

PLACE	STORY	AUTHOR	POINTS
1.	The Naked Sun (Pt. II)	Isaac Asimov	1.38
2.	With All The Trappings	Randall Garrett	2.83
3.	Sour Note on Palayata	James H. Schmitz	3.11
4.	Sourdough	Robert Silverberg	3.38
5.	The Doorstop	Reg Bretnor	4.27

THE EDITOR.

GET OUT OF MY SKY

Second of Two Parts.

What can be done when a people is faced with a situation they cannot tolerate...and cannot escape? There's a perfectly good answer. But the answer is not "scientific"; it cannot be achieved by any physical science!

BY JAMES BLISH

Illustrated by van Dongen

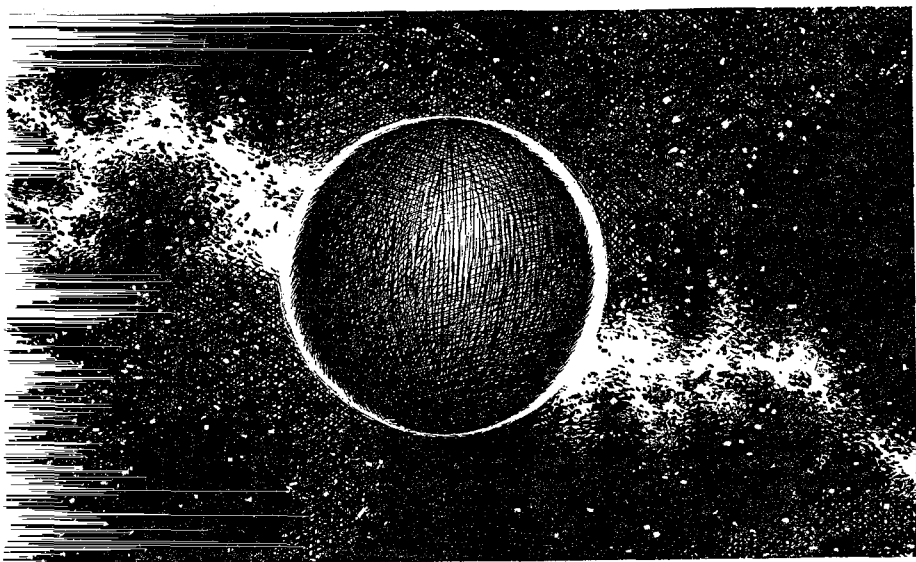


SYNOPSIS

The twin planets of Home and Rathe, both about the size of Earth, circle a common center in Trojan relationship with a red dwarf star; all three, in turn, revolve around a white star somewhat smaller than Earth's sun, dominated by the brilliant mass of the Canes Venatici star cluster, on whose periphery this solar system is located. Both Home and Rathe are inhabited, and the Rathemen, whose world is largely desert, have been aware of the existence of Home since prehistoric times.

Home, however, is mostly water, and the side of the planet which is perpetually turned toward Rathe is a single almost unbroken ocean;

ASTOUNDING SCIENCE FICTION



thus the inhabitants of Home did not discover Rathe until a few hundred years ago, when the discovery of the jet engine yanked them bodily out of a quasi-Elizabethan age into an era of rapidly pyramiding scientific achievement.

The effect upon the quarrelsome island-continent of the far side of Home has been devastating. Armed with thermonuclear weapons, the continents have been at the brink of war with each other for nearly half a century; now they are uneasily wondering whether or not it would be best to attack Rathe instead. Only the knowledge that the Rathemen, too, have missiles and atomic weapons keeps the situation in precarious balance.

AIDREGH, First Minister of Thrennen, largest of the island-continent, has inherited this dilemma at close to the point of explosion. Assisted by his son AIDRESNE, the product of a political but happy marriage with a woman from the next-largest island of Noone, he attempts to pursue a policy of moderation; he is well aware that any war between Home and Rathe will destroy civilization on both planets. He is advised unofficially by his personal surgeon, DR. NI, a naval officer and father of CORLANT, Aidresne's fiancée.

Aidregb's opposite number on Rathe is MARGENT, with whom he has been in communication by interplanetary television for some

time. Margent is subile, involved and indirect, but apparently not unreasonable; the Ratheman appears to be searching for a solution as diligently as Aidregb is. Aidregb's attempts to reach an understanding are opposed, however, by the Opposition party of Tbrennen, under the leadership of SIGNATH; it has long been advocating war with Noone, and when Aidregb concludes a treaty of alliance with that island, Signath, finding that he cannot muster enough support to have the treaty disavowed, turns to drumming up war fever against Rathe. This is far from difficult to do, since much of the population of Home is filled with resentment and superstitious fear of the recently discovered sister planet: "Get out of our sky!" is a common exorcism toward Rathe.

In the meantime, Aidregb is also forced to proceed as though war were inevitable, as even Dr. Ni, regretfully, thinks it is. Aidregb supervises extensive studies of the geography of Rathe, in the hope of gaining information which may be of military value. Several of these studies, such as an attempt to scout Rathe by guided missile, and another to photograph its surface from the antipodal ocean during one of Rathe's frequent eclipses of one or another of Home's three major light sources, are flat failures. Similar attempts by Rathe to scout the far side of Home are successfully frustrated. One highly ambitious project, however, does come off: the sending of an expedition to Nes-

met, a small planet near the white sun, to photograph the whole Home-Rathe system from the highly inclined plane of Nesmet's orbit. This, Home's first venture into interplanetary flight—though it has established a manned artificial satellite station—is enormously costly, but it does yield data indicating that Rathe has extensive missile installations ready in case of war, plus a fair map of the hitherto invisible "other side" of Rathe.

Also among the facts which the expedition brings home is the discovery that an earlier expedition from Rathe had already been on Nesmet—as had a still earlier camp of unknown origin; all the other planets of the system are uninhabitable by humanoids. Thus both planets now have accurate maps which increase their potentialities for mutual destruction.

Margent has already proposed that Aidregb come directly to Rathe for face-to-face discussions; the Ratheman has matters on his mind which he will not commit to a broadcasting medium, for reasons about which he will say no more than that they are "religious." The arrival of the Nesmet expedition convinces Aidregb that he must make the trip, to which he has already agreed on principle. Signath's party accuses him of preparing to sell out his own planet, and the general public on Home is equally opposed to the expedition for a different reason: since Aidresne will be going with Aidregb, the trip will

postpone the marriage of Aidresne and Corlant, which was to have been a major festival—both are very popular through the islands. When Corlant petitions Aidregh to be allowed to go to Rathe, too, he opposes it personally, as does Aidresne, but realizes that it will appeal to the public and deprive Signath of one of his most effective issues; consequently, he agrees.

Nevertheless, Aidregh's moderate government has now been seriously weakened. War is closer than ever. But the ships take off for Rathe on schedule. . . .

PART 2

VI

And they came down on schedule. As an adventure, the flight was something of a dud.

Aidregh was familiar with that segment of popular fiction which purveyed space flight as something uniquely wonderful in itself, and had always vaguely supposed that it would be. Captain Arpen's tremendous and terrible ordeal on Nesmet had helped to convince him, too. But there was nothing overwhelming about this flight—not for a man so worried over the outcome of the trip, and so loaded with work and responsibility, as to be hardly able to enjoy the present no matter where he was—a man, in short, who was going somewhere because it was important for him to be there,

rather than where he had been when he started.

To be sure, the trip was noticeably different from traveling by jetliner, principally in the large number of additional discomforts involved. Several times during the flight he had meant to take time to look at the stars, and indeed did catch a few glimpses, but they looked just like the stars he had seen from the satellite station: hard cold points, incredibly numerous, unwavering, and giving somehow an impression of iciness, except for the furious vortex of flame which was the Cluster. They were awash in the deepest silence Aidregh had ever known, a silence that even the occasional man-made sound aboard his ship could not dispel, a silence so intense that it had a sound of its own—a soft, distant hissing echo, like surf or the sound in a sea shell. It was the noise of his own blood rushing through the capillaries of his inner ear.

Except for the stars and the flowing silence, he suspected that his first space flight was going to turn out to be very like his first air flight: exciting in prospect, uneventful in fact, downright dull in retrospect. That, however, was before turnover, and the subsequent polite invitation from Captain Loris to watch the globe of Rathe from the rear blister as they made their landing approach.

Rathe was no longer a globe at all by the time Aidregh had gotten himself strapped into his seat. It was already so close that it looked

more like a saucer than a sphere—a tremendous expanse of ocher and yellow desert, blindingly bright under its triple illumination, and set here and there with the blue or emerald jewels of lake or oasis. Though he had seen substantially the same view from a telescope at the satellite station four days ago, it was entirely different now, seeing it uncircumscribed by the limits of the telescope's field of view—and growing noticeably larger, minute by silent minute, until it no longer had any edges at all.

"I think I can see the city we spotted in the eclipse photographs," Aidregh said, squinting. "Over there, at about twenty degrees, working a third out from the center of the disk."

"Yes, that's it," Loris said, preoccupied. He was not watching through the bubble at all—the heavily leaded, sandwiched layers of plastic and glass were too hard on definition. He had the image of the planet on a large screen, almost in his lap; from time to time the ghostly outlines of instruments were superimposed on the image, as his fingers called them forth from a simple digital keyboard. Occasionally a meter-outline bloomed in red on the screen, as the scanners down below in the unmanned computer section picked up an unusual reading and offered it in the control cabin for inspection; but thus far Loris had done nothing about them but hit the "kill" bar on his keyboard—the divagations were minor

and at random. He seemed to be paying much more attention to the pure musical pipings which filled the air around him: the readings of the four or five instruments which he now most needed to know from minute to minute. Dr. Ni had been much intrigued by the discovery that spaceship captains, like Arpen and Loris, had to have perfect pitch.

"Are we landing near there?" Aidregh asked after a moment.

"No, sir," Loris said. "We're landing far out in the desert. A five-mile circle, a long way away from any city or oasis. All three ships have to come down inside it."

The tones in the air made a chord of the inverted 11th. Loris punched a key and the root of the chord nastily; he punched two more. The chord vanished serially, with a mournful "sfree-sfrong" on the last two notes, and was replaced with the peeping of an oscillator.

"On target," Loris told his lapel microphone. He added to Aidregh, "The Rathemen picked the spot."

"They're not taking any chances," Aidregh said grimly.

"No, sir. We're being monitored from here on down. If we deviate from our orbit by more than two per cent, we'll never know what hit us."

Aidregh took the hint and fell silent. A moment later, a blast of organ-thundering, brilliantly white steam blotted Rathe out for several minutes, crushing him back into his seat. The long ordeal of a direct

vertical landing was beginning—the ordeal which would exhaust their every drop of reaction mass, and leave them dependent on the Rathemen for enough to get back Home.

And the men of desert Rathem would not be parceling out any water for reaction mass to potential enemies.

The three ships stood on the desert for perhaps two hours, apparently alone—though Aidregh knew well enough that they were being watched intently from the Cluster before there was any physical sign from the Rathemen. A radio message had acknowledged their announcement of arrival, and then even the radio had become silent; incredibly, there seemed to be no “regular” programs anywhere on the RF band. Aidregh’s party used the time to dog the ships down and make landing parties ready; they were still at the task when the Rathemen finally appeared.

They came racing in from the flat dune-rippled horizon in a horde of low, snaky groundcars, jointed into three sections and running on a multitude of inflated plastic spheres which rolled over the gliding golden sand with no apparent loss of traction. The cars drew up in neat ranks at the feet of the spaceships, and their drivers got out and stood immobile in their robes, each man at the head of his vehicle.

“They don’t look like military craft,” Captain Loris said. “Far too small.”

“No,” Aidregh agreed uneasily. “But there are a lot of them. It looks like more cars than we have men, at first glance. Didn’t they bring any passengers?”

They had brought one: a tall Ratheman who walked unerringly to Aidregh’s ship and began to climb the cleats leading to the control cubby. Aidregh hastily sent an escort with a respirator to admit him by the nearest cargo port.

The Ratheman refused the breathing apparatus. He arrived before Aidregh heavily flanked by armed guards, but he did not seem to notice them. In the flesh, he looked much taller than Margent’s televised image had suggested the Rathemen were.

“My name is Mareton, servant to Margent,” the Ratheman said in perfect Thrennen. “We are glad you have come. There is transportation outside for as many of you as will visit with us.”

“Thank you,” Aidregh said formally. “If you have no objection, we will leave some of our party here.”

“No objection; we will provision them. Those of you who accompany me must leave their weapons behind, however, and be prepared to travel individually. The cars will hold no more than two persons each one of whom must be the driver.”

Aidregh had expected the prohibition of weapons, but this proposed fragmentation of his delegation into units made him uneasy. “Is there

no other form of transportation available?"

"No," Mareton said. Aidregh thought he saw something very like sleepy amusement in the Ratheman's yellow eyes. He waited for a further explanation, but Mareton evidently had nothing more to say on the subject.

Briefly, Aidregh considered holding out for larger vehicles, but decided against it. He had no proof that larger vehicles even existed, nor would he be in a position to use any such proof even had he had it. Besides, there was probably no danger yet—and he badly wanted to avoid creating a stymie this early in the negotiations.

But it did make him nervous.

On the ground, the little cars proved to be even faster than they had seemed when observed from high up in the nose of the spaceship. Aidregh's car raced over the featureless dunes of the desert with an almost hypnotic gentleness, surging from ridge to trough evenly and without any apparent variation in its smooth flow of silent power. The dunes were not very high; the thin air of Rathe could not produce winds strong enough to produce huge heaps of sand; but since they were the first dunes Aidregh had ever seen, he was impressed. There were no deserts on Home.

The car's chauffeur was as silent as its power plant. He failed to respond by so much as a grunt to Aidregh's essays at conversation in the Rathe tongue, and gave Aidregh

nothing to look at but his hunched, burnoosed back. The desert quickly became monotonous; within an hour the three spaceships from Home had disappeared over the horizon, and then there was nothing but sand. Aidregh craned his neck to look out into Rathe's sky for a sight of Home, but he saw nothing but an expanse of almost impossibly deep blue, almost blue-black, in which both the Cluster and the white sun were flaming. Except for the darker color, it might easily have been the sky of Home; here, as there, it could never be completely night.

Aidregh adjusted his respirator again—the thing kept cutting into his face at one point or another, no matter how he fussed with it—and tried to settle back. Sand, and more sand. Then, at the top of an unusually high dune, perhaps a real hill with a layer of sand over it, he saw the city.

It was only a series of pointed shadows at first, but by the time the car topped the next rise it was markedly closer. For a man accustomed to the low, horizontally-organized architecture of Thrennen it was confusing. The structures were organized vertically, with peaked tops, as though supported by a central mast. Pyramidal caps with sloping sides ending high above the ground in a rectangular or polygonal frame, from which the curtaining walls fell away, also curving, to a wider base among the dunes. Peculiar trees with long trunks and sud-

denly exploding, frond-clustered crowns grew around their bases, making a green contrast with the panels of color that soared above them. None of the structures had windows, but some seemed folded in the front; like fabric; others were fronted with canopies supported by poles slanting upward from among the trees. Here and there a long, diaphanous banner stirred, trailed away along some current in the rare atmosphere, and drooped back again into graceful folds from its high peak. Once, too, Aidregh thought he saw one of the vast folded façades begin to part, as if being thrust to either side at the bottom; but the air was shimmering with heat, and the folds frequently rippled of themselves on that account at this distance—the effect was purely optical. The huge assemblage of pavilions seemed silent and solemn, as though waiting for some event which might never happen at all.

A low domed hill cut off the view, and then the car was wriggling along a valley. There was less sand now; the sides of the valley were rocky. A few minutes later the car was humming toward a low cliff with a cul-de-sac at its end—or, no, not a cul-de-sac, but a dark hole that looked to be little more than a burrow. The car plunged into it without hesitation.

For almost another hour by Aidregh's chronometer, the vehicle continued to race in complete dark-

ness, darting and twisting through one invisible corridor after another. During all this time there was nothing for Aidregh to look at but the soft blue glow of the instruments on the vehicle's dashboard, and the back of his unresponsive driver. By the occasional popping in his ears, he judged that they were going steadily downward, and after a while he chanced snatching a breath outside his respirator. The air pressure was still low and the humidity was almost nonexistent, but it was quite thick enough to breathe without discomfort as long as he was doing nothing but sitting. He took the respirator off with relief.

The car snaked down a dizzy spiral in the darkness and resumed its wriggling, centipedelike run. The air pressure continued to rise, and so did the temperature. The driver made no move. He, like Mareton, had not been wearing any respirator at the start of the journey, and he was not wearing one now; evidently the Rathemen could accommodate a much wider spectrum of pressure and oxygen-tension than the Home people could. It was a point to remember—though doubtless one of the scientists, undergoing a journey very much like this one somewhere else on Rathe, had registered it in far more precise terms by now; had perhaps even evaluated it, which was quite beyond Aidregh's powers.

Dazzling light burst suddenly in upon him, and he flung his arm over his eyes. While he was getting

his vision back, the car came to a smooth stop. Blinking, he peered out cautiously.

They had debouched into a small cave, perhaps fifty feet high, brilliantly lit by an overhead glare too bright to see directly. The driver opened the car silently; the moment Aidregh was out, the car scuttled away through a low circular door, like the one which had admitted them. There was one other entrance, cut to admit men rather than vehicles.

For an instant, Aidregh was alone. Then the door opened.

Margent came out.

"You made a good journey," the Ratheman said gravely. "Come in. There are comfortable quarters inside."

Numbly, Aidregh allowed the Ratheman to take his arm. He noticed suddenly that he had been holding his breath, and let it out with a long sigh. Had he been expecting, unconsciously, that Margent would . . . would smell bad? He didn't; he had no perceptible odor at all. Aidregh hoped that Margent would be able to say the same of him— Curious that he'd had no such reaction to the driver of the groundcar.

The quarters beyond the door were indeed comfortable, if a little odd by home standards. The illumination was that some merciless overhead glare, which made everything look bare and cheerless, especially since there was no furniture. Instead, the room was heaped

with fabrics of all kinds: blankets, rugs, stuffs like silk. Dr. Ni was sitting on one such accumulation, looking remarkably ill at ease. He jumped up with a wordless exclamation as Aidregh came in.

"Hello, Ni," Aidregh said. "I'm glad to see you, too. How about the rest of the party?"

"Not here," Ni said. "Margent won't tell me where they are."

"No," Margent said immediately. "We have separate quarters for them, that is all. We did not want to put you all in a barracks. This will be your home while you are on our planet."

"But where are we?" Aidregh said.

"The exact location does not matter. As I think you may have understood, you are many miles inside Rathem; this is one of the shelters we have carved out, in which we hope to save a fraction of our race, should there be war. Your son and Dr. Ni's daughter are in another such, with several of your ships' officers, since your custom seems to require that such a couple not be left alone."

Both Ni and Aidregh grinned at this. The Rathemen's concern for chaperonage would have been grotesque had it not been for the circumstances; but how were the Rathemen to know what customs were not to be violated under any circumstances, and which were merely conventions? Their caution made sense.

Margent did not notice the grins

—or chose not to notice them. "Others are similarly quartered elsewhere. But this question is of no special moment yet. You will need rest after your trip, and then we may talk about matters of substance."

"May Dr. Ni and I talk to our children, and the other people we brought with us?" Aidregh said.

"No," Margent said, without expression. "Not at this time. Nor may you leave these rooms, for the moment. The reasons will be explained after you have rested. I will return tomorrow."

He went out, with that abruptness with which he had always terminated his interviews. Aidregh and Dr. Ni stared at each other.

"You're supposed to call Drash tonight, aren't you?" Dr. Ni said.

"Yes."

"What will happen if you don't?"

Aidregh sat down on the lumpy fabrics.

"I don't know," he said. "I'm afraid to think."

Margent was back the next day, very early, long before Aidregh and Dr. Ni had begun to work the stiffness out of their muscles; they had stayed up late in fruitless speculation, and the piled fabrics had not afterwards been kind to their bones.

"There will be food immediately," Margent said. "Shall we talk now, Aidregh?"

"By all means," Aidregh said. "I don't know what havoc you've al-

ready created, Margent, with this imprisonment, but it may not be too late even now. Somehow, in spite of everything, I think you are a reasonable man; I feel it in my bones."

Margent bowed slightly. "I do what I can," he said.

"All right. I have come all this way to accommodate you. Surely there is something we can do, something decisive, that will make our worlds friends."

"There may be," Margent said. "I did not ask you here for nothing."

He paused while three silent Rathemen came in with breakfast: a huge circular platter for each of them, bearing dried fruits, a kind of bread, a pot with a long spout out of which a smoky vapor curled and disappeared almost instantly in the dry air. When the servants—guards?—had left, Margent said:

"I must ask you certain questions. For instance: What do you swear by?"

"Nothing, usually," Aidregh said wonderingly. "By the Cluster, sometimes. It's not really an oath, only an expletive."

"I understand. But it means that you have Cluster worship on your planet, or you did at one time? Yes; so do we; we have it still. Now: Do you also have the Three Shadows?"

"Yes, indeed."

"It could hardly have been otherwise," Margent said with gloomy satisfaction. "Now at last I will make



myself clear, Aidregh, and then you will understand how enormous a problem faces us both. Cluster worship is very powerful on Rathe, and because we have always been able to see your world from the very earliest times, your planet plays a major role in the religion. We are a custom-ridden people, with ceremonies for everything, all of them governed in turn by the positions of the Three Lights and the Sister World; this very conversation, for instance, cannot be prolonged one minute beyond one hour, for the stars would then be inauspicious. Is this clear, and, more important, is it credible?"

"It is both," Aidregh said. "At home, this system of belief is called astrology; but it is widely discredited and its subscribers are a little shamefaced about it."

"Not so here," Margent said.

"There are reasons behind rituals; they establish patterns which facilitate the movement of thought in the desired direction, as music does. When a whole race becomes involved in such customs, it is because that race has goals; when those customs are disrupted, the resentment is likely to be very great. In our case the disruption cannot be tolerated any more. My people absolutely demand that this situation between our worlds be brought to an end. You are not aware of the fact, but our culture has *already* been half destroyed by it. I do not think you can know what a menace you are to us."

"A menace?" Aidregh laughed shortly. "I'm aware of it, all right. Most of the weapons involved were built by my order."

"There you are quite wrong," Margent said quietly. "The weapons



which menace us are not yours. Those can only kill us, and every man dies in due course. The weapons which have already done such enormous damage are our own."

"I don't understand."

"There is a device which we have perfected," Margent said. "Our fission bombs are clad in sheaths of a certain metal. When the bombs go off, they will have an effect which will much outlast any immediate destruction they may cause. They will poison your air with a radioactive isotope of this metal, which has a half-life of more than five years. We have enough of these weapons to destroy utterly not only your people, but every form of air-breathing life on your planet, all the way down to the lowliest worm. It is not even necessary for us to hit specific targets. We know that the secret you possess produces vastly

greater explosions than our bombs do, for we saw one of the tests; so we know that you can wreck the entire surface of our planet. But we doubt that your bombs will poison our air, except transiently. In deep shelters such as these, some of us may survive."

Had he been dealing with someone of his own race, Aidregh would have known without question that Margent's face was racked with the deepest of griefs as he said these things, though his voice was quite even. Somehow, Aidregh did not doubt that the emotion was there, nevertheless. He was astonished to find his heart going out to the man; he felt an urgent, irrational impulse to assuage his suffering in some way.

"Still I don't understand," he said. "What you tell me is horrifying, of course. But by your own

showing, the menace for us is far greater than it is for you."

"The existence of these weapons is the greatest threat to Rathé that has ever existed," Margent said. "They are the reason why your planet is a menace to us—because you have forced us to think in terms of destroying another race. This kind of thinking has been unknown on Rathé for many centuries, and it is ravaging us like a flame. It must be stopped."

Aidregh and Ni looked at each other, dumfounded. Aidregh tried desperately to capture some idea of the value system from which Margent's speech must have emerged, but it slipped away from him almost without trace.

"I see where your difficulty lies," Margent said. "I will try to explain—"

"Margent."

"Yes, Aidregh."

"*Are you reading my mind?*"

"Yes," Margent said. "Do not let it trouble you, it is quite normal. I will explain. Consider, if you can, what our situation has been here on Rathé. As you know, the planet has always been poor in water and in arable land. Furthermore, it is poor in metals, particularly the heavier ones; our present war implements have virtually exhausted the supply. Under these circumstances, we did not develop any extensive physical science. The fact that there have never been any real natural barriers between peoples on Rathé made

warfare uncommon even in primitive times, so the major stimulus for physical science was removed, and the lack of supplies for pursuing it inhibited it still further. Thus as we grew older we tended to concentrate on the humanities—the arts, ethics, communication, human behavior. Under the influence of these studies we eliminated our primitive nations, evolved a common language, reduced our government to next to nothing, eliminated crime, and in general cleared away enough clutter to make it possible for us to attend to serious matters. In the past century we have been exploring the reaches of the mind—not the shadow which bears that name, but the thing itself in the living man. The telepathy which you have noticed is one outcome of these researches, and incidentally a minor outcome."

"This is an amazing record," Aidregh said, "and it's clear proof of what I had suspected all along: that we have a lot to learn from you. But still—"

"I am coming to that point. Think now what happened to us when our first crude radios picked up the broadcasts from your planet—which, because of all that water, was the abode of the soul to our primitive people—and what those broadcasts revealed about you. You were having a war then; it was during the liquidation of the Medani. That crime appalled us all, yet we could do nothing but stand helplessly by while it was committed. And the

conviction was slowly borne in upon us that our own time might be coming; that regardless of our own feelings we must prepare some defense against you.

"You will not understand when I say that the ensuing period was like an orgy, but I can compare it to nothing else. For half a century we have hardly had two sane thoughts in succession on Rathe; our minds have been submerged in preparations for blood-letting. We have brought ourselves back to a state of mind where it is possible for us to think of wiping you all out. That event alone has been more devastating for us than any actual war is likely to be. Furthermore it has set back our serious research, we do not know just how far—perhaps by several centuries."

"How could it do that?" Ni asked practically. "I can see that it might have halted it for the time being, but surely knowledge already gained can't be unlearned."

"It can in this field," Margent said. "The physical sciences are positively deadly to the highest functions of the mind. The only example I can give you that would be familiar to you is one in ethics: how is it possible to cultivate an ethical sense while you are simultaneously making fission bombs? The two are not only incompatible, they are actively hostile. Similarly I can tell you that a sophisticated science of radio is antithetical to any real command of telepathy. The same antitheses exist throughout

the whole range. That is why this hostility between us *must* be ended. The only outcome possible is peace. Your planet and mine are so different that we can find no real grounds for disagreement, let alone disagree so fundamentally as to precipitate a war."

Aidregh mopped his brow. "There's no doubt about that," he said hoarsely. "But I can't imagine this argument having any force back home. The opposition will laugh it out of existence."

"Not when they understand it," Margent said. "Your people are neophytes in problems of conscience; you do not know what damage has already been done to *you* by these war preparations. But I can tell you what will happen if you should succeed in destroying Rathe without losing a single life on your planet—which I take it would be regarded as the *best* outcome by your opposition."

"I'm afraid it would."

"It would be suicide," Margent said evenly. "If your race were to take the blood of ours to itself as a burden, it would never solve its own local conflicts. Your ethical evolution would be stopped in its tracks, and shortly thereafter you would kill each other off."

There was a long silence, except for a single convulsive swallow from Dr. Ni. At last Aidregh said:

"Why couldn't you tell me this before?"

"Because there is more to come

that cannot be told in words," Margent said. "I have told you that our development did not stop with the humanities; that it has progressed into fields which your race does not even know exist. Out of these researches we propose to give you a weapon, but what could I have said about it over the radio? We have a saying in Rathe: 'The color-blind man may dye his tent red or blue, but he will not dye it in stripes.' The best that I could do was to hint at these matters under the general head of 'religion,' the only word in your language which applies even vaguely to them. They have to be experienced, and that is why we have brought you here. Once you have learned what we mean to teach you, you will find that your argument back home will not lack for force; the future is plain on that point."

"The future!"

"Yes. Fifty years ago anyone of us could have told you accurately and in detail what lies ahead, but what I have called the orgy of war preparations, has nearly ruined the faculty. Now it gives us little but vague blurs; but on this question there seems to be no doubt."

Aidregh was now so used to being stunned that he was beginning to feel that it was his normal state of mind. He said at last, "Very well, I am in your hands."

"I am honored," Margent said. "But it is not you, we have discovered, who must undergo this ordeal. Since you have arrived here, we

have found that you will be less able to use the experience than others in your party. That is why I have included Dr. Ni in this conversation: those we propose to use are Corlant and Aidresne."

"No!" Ni was on his feet in an instant. "I won't have it! If anybody—"

"Ni, wait a minute," Aidregh said, softly but insistently. "There's no harm intended, can't you sense that? You're still thinking in the Home terms, and they don't apply here. Let's try to understand the thing first."

Ni looked at him for a moment, and then unclenched his fists slowly.

"If you say so," he said, shrugging. He sat down again, a listless caricature of Worldly Wisdom, as though his emotional outburst had betrayed him to himself.

"Tell me, Margent, why does it have to be these two and no others?"

"It does not," Margent said, with what seemed to be obvious reluctance. "But we think that they alone can undertake the instruction wholeheartedly, and integrate it fully."

"Because they are young?"

"In part, but only in small part. We were guilty of thinking in inappropriate terms also. It is a fact of nature on Rathe that all men love one another, and we unconsciously expected that the relationship would exist among you too, however imperfectly. But it does

not. Of all your party, only four are bound by those ties, and only in Corlant and Aidresne is the tie full and perfect. Since love is the core of understanding, why make anything less serve?"

The point, Aidregh thought, was peculiarly forensic; long training in the less exalted concepts of politics enabled him to detect, through language alone, when an opponent was on the defensive. He looked steadily into the Ratheman's eyes.

"But others among us *could* learn?"

"Perhaps," Margent said, stiffening slightly. "We would not encourage the experiment. Many of our people would be deeply suspicious of it, which would be a poor atmosphere for learning—and the time is very short. Even to Corlant and Aidresne we can teach only certain rudiments, but we hope these will serve the purpose."

"What do *they* say?" Aidregh asked quietly.

"They have agreed."

Dr. Ni was wringing his hands and looking at the floor; the doctor was obviously in anguish. Aidregh could not help but share his distress, for Margent's wording, even the positions of his body underneath the many robes, telegraphed that his proposal concealed dangers. Aidregh himself would have undergone whatever ordeal Margent had in mind without hesitation, but this proposition was something else again. What, after all, did Margent

know about the minds which he was prepared to subject to his wholly mysterious "education"? What if they broke under the strain? Then war would surely come, and the children would be gone, their sacrifice for nothing—What was it that Ni had said, so long ago? "You're killing yourself in the name of a set of abstractions." Himself, yes; but the children?

"I cannot agree out of hand," he said at last. "There is at least one stopgap we should try first. You must allow me to call Home, and explain this business of the metal sheaths on your bombs, and ask for patience. I have no technical details to give away, not even the name of the metal involved, and I won't mention the half-life of its isotope. In any event we couldn't revamp our weapons in time, no matter what I inadvertently give away."

"I was prepared even for that," Margent said; and now Aidregh was quite willing to be sure that he saw a faint tinge of complacency in the Ratheman's response. "It will not work, Aidregh; it is a method of fear. Nothing will serve now but methods from love." The glowing eyes were regarding him steadily. Was Margent actually *pitying* him? "But you may try it. There is radio equipment ready for you in the next room."

Aidregh almost ran out of the chamber. Thus far, Margent had not read what was going on at the deeper levels of his mind—either his success at reading its surface

thoughts and anticipating them, or the planet-wide impairment of such psychic functions which he had described, was impeding any real penetration in depth. Aidregh's escape left Dr. Ni staring alternately at the Ratheman and at the floor.

When Aidregh came back, his face was ghastly and he knew it, but there was nothing he could do about it. His shoulders felt as though they were being dragged down by the clinging hands of a billion dying people. Dr. Ni sprang to his feet with a choked curse. Margent did not move, but the fires that burned in his hooded eyes leaped and flickered.

"Too late," Aidregh said hollowly. "You were right, Margent. There is already a coalition government there. Signath worked faster than I'd dreamed he could. The overnight silence helped him. I told him what you had told me, but I'm the last person in the world—in two worlds—that he would listen to. He gives you three days to release us all. After that, after that—" His voice failed him completely.

Dr. Ni had turned white with rage. "The criminal idiot!" he shouted. "Deadlines in total war! Announcing the date of an attack—"

Margent raised his slender hand. Ni choked off his fury with obvious reluctance.

"It cannot matter," Margent said gently. "We would never fire first in any event. We will see your shots coming, in plenty of time to launch

our own weapons before yours get here; and so we will both be destroyed. We will respect the deadline; why not?"

"As you say, it makes no difference," Aidregh said huskily. "The war has begun. We have all lost; the end is upon us."

"No," Margent said. "Not quite. Give your consent, and it can all be changed."

VII

For the rest of the day, Aidregh moved about the room in a dull, aching fog, picking at the food that was brought in, exchanging no more than a monosyllable or two with Dr. Ni. When, after an eternity, the light dimmed for the night, he found that despite his exhaustion it was impossible to sleep. At last he heaved himself up on one elbow.

"Ni?"

"Urhmm?"

"Ni. Listen to me. He's wrong."

"Who's wrong? Margent? Of course he's wrong. He's a madman."

"No, he isn't mad," Aidregh said. "He's a wise man. We've been underestimating him, and all the Rathemen. His proposition is logical: if there's no way out of this except through the children, then we have to give them the chance. After all, they *have* consented."

Dr. Ni sighed and sat up. "I thought it would come to this in the end," he said, his voice charged with bitterness. "But not for me,

Aidregh. Politics stops here for me, no matter how much farther you're prepared to go. As far as I'm concerned, both worlds can die, if this has to be the price for saving them—either of them."

"But what price are you talking about, Ni? We don't know what's planned, and Margent can't describe it to us. We haven't the terms. There's a whole new science here, a whole new way of thinking that doesn't even exist as far as our language is concerned. All he can say is that he can give us a weapon that will stop the war. How do we know it mightn't also be a great gift? What is it that we're protecting the children from, anyhow? It might well be something marvelous."

"Yes. Or something deadly."

"Something so deadly that we have to save them from it—to die under our own bombs? Is *that* mercy, Ni?"

"It may well be," Dr. Ni said, his voice harsh and flat. "I can't quite tell whose side you're on. But there's one thing I know as a doctor: that of all the things in the universe that a child needs to be protected from, his parents are usually the first. You're beginning to sound like a classical example of that law."

"I know it," Aidregh said. "I don't mean for an instant to let the children go through with this, any more than you do. Politics stops there for me, too; you taught me that. I was only trying to show that Margent is not a madman. He's

wrong, but that doesn't automatically make a man crazy."

Dr. Ni sighed again.

"I suppose not," he said. "You confuse me, Aidregh. Please tell me very simply and straightforwardly what the Isle you're talking about."

"I mean to take this training myself."

Ni was silent a long time. At last he said slowly, "Margent won't like it."

"No, he won't. He's said pretty plainly that I'm not the right person for the job, and furthermore I think his reasons are probably pretty good. But he's unable to pretend that *only* Corlant and Aidresne have any chance of success. He says only that for anybody else to take the job would make it very hard. All right. I'm used to doing things the hard way. After a pretty long life I'm convinced that there is no other way."

"That's a dogma," Ni said. "Why shouldn't I take it on, instead of you? Corlant's my daughter. And at least I've had some scientific training; I might make a better subject than you would."

"I doubt that. I think scientific training is the *last* prerequisite for whatever Margent has in mind. The science involved is obviously nothing like anything we know. And the decision is mine, Ni. I will not allow Aidresne's life, or the life of Home, to hang from the capacities of any man but myself. I am not going to step down now and let

the children carry the burden, or let you do it, either. That burden is mine, and no one else's."

"But how do you know it will do any good at all?" Ni demanded. "Margent's a mystic. How can you believe anything he says? Half of it sounds insane."

"Signath isn't a mystic. Is *he* sane?"

Dr. Ni released a third long, ragged sigh, apparently without being aware of it. "I'm not even sure that *I'm* sane by now," he said. "Corlant is my daughter, that's what I keep coming back to. I'm trying to be reasonable, but I have to think of her first. If Margent thinks she's the most competent—"

"Do you think that you're alone in this room, Ni?" Aidregh said bitterly. "Aidresne has been my whole life since my wife died, and Corlant is the only meaning that his world has. How can I think less of her than I do of him, if that's how he feels? But there's no chance that we can all just lie back and wait for somebody else to take on this job. Either I let Corlant and Aidresne do it, or I take it on myself, as I came here to do. That's what I'm going to do."

"You won't let me tackle it?"

"No. You would fail."

There was a muffled choking sound in the dimness. Aidregh felt as though he had already become a moral monster; the man was, after all, his friend. Then, huskily, Dr. Ni said:

"I think I would. So might you."

A long pause, filled with irregularly drawn breaths. "The Cluster help us all if you do, Aidregh—but you have my consent. Is that what you wanted?"

"Yes," Aidregh said. "As you say, Corlant is your daughter. I can't refuse to let her do what she's volunteered to do. That was up to you."

Dr. Ni lay down with his back to Aidregh. If he knew that Aidregh had led him a full 270° away from his original stand, he gave no sign of it; nevertheless, Aidregh sensed that a friendship was ending, here in the darkness. He did not attempt to speak to Ni again that night.

After a while, he too was asleep, but it was a sleep filled with portents and without rest—an underground sleep, which would never see the roses of the day. After a while, it became tenanted with a vision: Aidresne's dead mother. She did not speak either, but her eyes were glistening with sorrow and incredulous reproach.

Margent did not like it. He arrived early the next morning with his two guards, and Mareton; they made small talk through breakfast, and when the guards left, Margent said, "We must have your decision now, Aidregh."

His face was stony. Evidently he had already gathered through his mind-reading the essence, if not the details, of Aidregh's decision. Nevertheless Aidregh took pains to

spell it out with painful clarity. Throughout the recital, neither of the Rathemen's faces moved a muscle.

"This makes everything very difficult," Margent said after a short silence. "Most of us on Rathe are deeply suspicious of this project in any event, and do not view the teaching of the *voisk* forces to any of you with approval. It is perhaps analogous to the giving away of military information on your planet. Only the endorsement of the Margents made it possible to make the offer at all."

"The Margents?" Ni said. "There's more than one of you?"

"There are twelve," Margent said, with a preoccupied gesture. "The name goes with the office. Each of us has full and constant access to the memories of all the others now alive, and all of those who preceded us in the office. Thus we are all the same person, even second by second. The accumulation of memories is more than powerful enough to make us look alike, as well, though we are not genetically related. Our appearance is that of the first Margent, who was the



first to realize that memory depends totally on trans-temporal mind contact—and live through the discovery long enough to make use of it.”

For some reason, this did not make Aidregh feel any more sanguine. It was, after all, the *voisk* force, or one of several, that he had apparently volunteered to expose himself to. He said, “I’m sorry that the decision will make it more difficult; but it is the only decision I could have made.”

“Very well,” Margent said stiffly. “You will be very closely watched, Aidregh, by observers largely hostile to you. At the first sign of faltering of your purpose, or of failure to use the instrument properly, the experiment will be at an end. It would not have been so for Corlant and Aidresne, but since you are chief of state of your planet, caution can dictate no less.”

“Precisely how would the experiment ‘end’?” Aidregh asked steadily.

“Why, by ending it, and holding you all hostage to your planet’s good behavior,” Margent said. “Of course if you are far advanced in manipulating the *voisk* force before any wavering becomes evident, you will be proportionately more dangerous and may be cut down where you stand. But in view of the ultimatum under which we labor, I can hardly see what practical difference that makes.”

“No, of course not.”

“Do you want to proceed under those conditions?”

“Yes,” Aidregh said.

“Very well. We have three days. I think we will get very little sleep.”

VIII

They took Aidregh to the surface, through a complex network of stony corridors which he found impossible to memorize. He found himself at last inside one of those huge, many-colored tents which he had seen during his trip across the desert. Its peak was shrouded in dimness. Light fell toward the floor—which was smooth-raked sand, for the pavilion was a true tent without foundations, for all of its size—from a sort of censer which hung halfway down.

Ten of the twelve Margents were there, which Aidregh found upsetting in itself. They looked, as Margent had warned him, exactly alike, and sounded exactly alike. Although their robes differed in small details, Aidregh had lost track of which one was “his” Margent within a few minutes. Perhaps there had never been such a person as “his” Margent; they might easily have spelled each other before the television cameras without his being aware of it. To clear this irrelevant confusion out of his path, he quickly adopted the stratagem of regarding the one that was speaking as “his.” It worked poorly, but it was better than no stratagem at all.

“What we are going to teach you, we hope, is a trick,” Margent told him, sitting down on a carpet among

the others. "Obviously it would be impossible to teach you a whole science in three days—or even enough of it to let you enter the field as an investigator on the lowest level. But if we can give you enough understanding to enable you to perform one trick, that should serve the purpose."

"Not a very flattering assessment," Aidregh said grimly.

"But a true one. Who was your greatest genius in physics a dozen dozen years ago?"

"A man named Arod," Aidregh said, puzzled. "He discovered the electromagnetic spectrum and worked it out mathematically. I don't know the details."

"The fact is sufficient; that was an impressive achievement. Now, suppose you could bring this man Arod forward into the present era. Could you teach him nuclear physics in three days?"

"Hm-m-m," Aidregh said. "No, we couldn't. He'd be able to learn just enough to realize that such a field of knowledge existed. He'd be able to perform a few tricks with apparatus we had set up for him, and he'd go back to his time with a splitting headache."

One Margent smiled briefly. "After he had returned to his own time, could he then refine the power metals, compute neutron capture cross-sections, and set up his own reactor?"

"No. He'd probably just die of frustration. Believe me, Margent, I'm convinced. I'm no Arod; learn-

ing one trick is good enough for me. What is the trick?"

All of the Margents frowned simultaneously and looked at each other. For the first time, their expressions reflected real uneasiness, or at least uncertainty.

"We are going to have to answer that by talking around it," one of them said at length. "Your language simply does not contain the necessary terms, and to substitute into it the appropriate terms from our language would just result in meaningless noise for you. We are going to teach you to manipulate an energy, one of what we have called the *voisk* forces, which can assist you to sway an audience."

Aidregh was about to exclaim "Is *that* all?" when he saw all the Margents, and Mareton too, leaning forward tensely. The movement was so slight inside their concealing robes that he had almost missed seeing it entirely.

He drew a deep breath and said instead: "Very well. Go on."

The Margents and Mareton leaned back again, and some of the tension went out of the cathedral-like atmosphere of the huge tent. Evidently, Aidregh thought, one of the rules of conduct—or of the science itself, perhaps—made failure to take the right attitude less heinous if it was unvoiced, or thought better of. A cross-relation between the words-vs.-works doctrine of ethics, and the observer-effect of physics? In any event, it had been

a near thing; he would have to keep the rule constantly in mind.

"There are several words in your language which skirt what we have in mind," a Margent said. "One of them is *empathy*; another is *charisma*. Neither one is the power we are talking about. Such words as sympathy, warmth, accessibility, appeal, personality—they all fall into the same area. None of them describes the power, either, however."

Aidregh began to see another reason why the road before him was going to be stony. He tried to imagine a concept-area bracketed or bounded by all these negative definitions, but instead they all overlapped in his mind and left no room for a hole through which some unnamed concept might peer.

"Can you show it in operation?" he said. "A functional definition should be possible—one which doesn't depend on semantic content."

"Certainly; that is the next step. Mareton, will you read to us?"

From his robes, Mareton drew forth a small scroll, unrolled it, and began to read in a dry, precise voice:

"In the epoch 480, while the policy of proportional water doles was still in effect despite its inequities, the use of ground water for industrial purposes rose by twelve gross megabires per cycle, while additional supplies to the sum of a gross megabires was drawn from

standing sources—such as lakes and oases. Recovery from rainfall during the same period fell a gross megabires as standing sources lost surface area, forcing the transfer of the major part of the load to the pipeline system, which was by then grossly inadequate to carry it. Nevertheless, the proportional dole system was maintained for another epoch of cycles, thus completing the breakup of the nation-tribes upon whom the principal shortages fell. It now appears that this political effect was what had been intended all along by the devisers of the dole system.'"

Aidregh swallowed. Though the story was from the history of another planet, he had never heard anything that had struck the note of tragedy more deeply, or in such sure prose; his throat felt positively dry. Only its apparent irrelevancy to the *voisk* forces made him hesitate to say so—yet he was perfectly convinced that, had he been born an artist, he might have made an immortal epic out of Mareton's precis.

The Margents were all watching him silently. Slowly, he recovered his detachment, and thought back over what Mareton had read, as carefully as a man walking on new-frozen ice. Tragedy? No. *In esse*, perhaps, but not *in posse*. What Mareton had read him had been a piece of unfeeling statistics. And he had very nearly wept over it!

"I see," he said at last. "It's a striking trick, and I can see where

it would be valuable in politics. Does it work with a large crowd? Or does it thin out?"

"It works over interplanetary distances with no detectable diminution, like all the *voisk* forces; we tested that during our Nesmet expedition, of which you know. The only physical requirement is that the audience be able to see or *visualize* the speaker. The audience may see a televised image, a still photograph, a painting, a caricature, or simply a memory, so long as it has some eidolon of the speaker in the visual circuits of the brain."

Even Aidregh's small knowledge of physics told him that this was quite implausible—indeed, irrational. Since he had never been trained as a scientist, however, he found himself able to get over that mental hurdle with comparative indifference. He wondered whether Ni would have been able to clear it.

"Did you use this to bring me to Rathe?" he said suddenly.

"In part," Margent admitted composedly. "But you were not compelled; this force cannot be used to convince the subject of an unreal situation. The logic of events must always be in tune with it, as it was in your case. Now we will ask you to try it, Aidregh."

"But I still don't know how—"

"We are aware of that. Try it anyhow."

Mareton rose and handed him the scroll. The object was clumsy for a man used to books, but after a mo-

ment Aidregh discovered how to handle it: the two rolls could be spread between the hands so that the desired paragraph was held taut before his eyes. What little of the rest of the text he could see was as dull as the paragraph Mareton had read—and that was appallingly dull, now that he himself had to make it sound convincing. But he did the best he could, terribly conscious of the intent regard of the Rathemen.

"A total failure," Margent said gravely when he had finished. As his heart sank sickeningly within him, another Margent added, "Do not be alarmed. Another negative demonstration was what we were aiming at. You needed to know what this *voisk* force was *not*, on the operational level. You have just summed that up."

"How did I do that?" Aidregh demanded incredulously.

"By using nearly every technique your world has evolved for getting along *without* the force. You read the paragraph with great eloquence. Your tone laid heavy emphasis upon the little bit of human content the passage has. Your bodily expression—the communication method your culture calls 'parataxis'—reinforced your every point. Your diction was clear, controlled, elegant, yet it filled the whole pavilion without the slightest sense of strain. The variations, in volume, in huskiness and other pitches suggesting emotion, were as precise as music. In other words, you made as much of the passage as a truly

great actor or politician could make of it.

"And not one bit of this is pertinent or useful to you now. Not one bit of it has anything to do with the trick *we* want to teach you."

For a moment, Aidregh sat stunned. Yet it was true: while Mareton had been reading that same passage, he had employed not a one of the highly developed techniques of speaking to an audience which Aidregh used as a matter of course. He had simply read it—even droned over it. Yet the emotional impact had been profound.

There was really nothing in the passage that *deserved* the elaborate art of rhetoric, though that art could heighten it spuriously. For this audience, such heightening was obviously worse than useless—it was actually in the way of whatever they were trying to make him understand.

And by the way they were looking at him now, he realized that he had already reached the first test. He was to get no more help past this first stage in his understanding. If he failed to integrate and use all the negative definitions which he now had, in profusion, the experiment would be over.

And he would fail both the children and the world of Home.

"May I try it again?" he said at last.

"Yes," a Margent said, without expression. "Once more."

He read the passage through to himself. What had he actually felt,

in himself, while Mareton had been gnawing aloud this dry bone of economic history? He forced himself to go slowly, trying to recall each emotion as it had surfaced, almost word by word, holding each new memory in the forefront of his mind, in the hope of piling up that cumulative feeling of total consent which Mareton had provoked in him.

It was horribly difficult. For the first time, he had a dim appreciation of what it might be like to compose an opera.

Then, slowly, he began to read aloud. His voice sounded lifeless in his ears, but he tried to pay no attention to that. Instead, he "scored" the text like a composer, inside his own head, with the memories of how it had made him feel when Mareton had read it to him.

By the time he reached the last word, he was trembling, and drenched with sweat despite the almost total dryness of the air in the tent. Nothing he had tried to do in all his life before had been so difficult as this.

The Margents and Mareton listened gravely, their yellow eyes watching him with a hooded intentness. Afterwards, the hazy reaches of the pavilion were quiet for what seemed to be hours.

"Weak," one of the Margents said at last. "And considerably garbled. But there was some transmission. You have felt your way to the beginning; you have the concept, at least intuitively."

Mareton nodded. "He has it," he agreed. "But now he must attempt the real problem: making it work."

Dr. Ni was still awake when Aidregh, after eighteen grueling hours, was returned to the underground apartment for a few hours' rest. Though Aidregh's nerves screamed for sleep, he saw at once that the suspense had already driven the doctor nearly into hysteria. There was nothing for it but to describe, as briefly as possible, what had happened to him on the surface.

"This is all so subjective," Ni said, gnawing at what was left of a fingernail. "Nothing that can be measured—just a set of feelings, that get reflected in someone else's feelings. Somehow I can't see how you can trust it. Especially not with so many lives hanging from it—"

"Oh, it can be measured," Aidregh said wearily. "The test in the tent was only the beginning. Then they took me outside, through the city, to another pavilion—a squat, octagonal affair much bigger in volume than the first one. It was a laboratory of some kind, obviously. Machines on benches, scattered all over the floor. Most of them looked to me as if they'd been put together by a skilled ignoramus trying to pass as a genius: breadboard affairs, half wire, a quarter plumbing, a quarter collage and garbage.

"But I didn't say so; I'd learned that much, at least. Margent—one of him—told me that all the apparatus operated on one part or

another of the *voisk* spectrum, and demonstrated several of them. For instance, there was a device that seemed to be a sort of *voisk* transducer; of them all, it looked to be the closest to pieces of electronic apparatus I've seen on Home. He had Mareton do the trick they're trying to teach me, and showed me the tracings it produced. Then he ran off comparison-curves from other parts of the spectrum, like the pre-cognitive and the mind-reading areas he described before. There's no doubt but that the *voisk* forces can be measured, once you've enough of a grip on them to feed them through appropriate instruments."

He paused a moment, realizing just how what he was about to say was going to sound to Ni. But he was too weary to tackle the extra job of copy-reading his memory; it was all he could do to tell the story unedited.

"The question is," he said, "just what constitutes an appropriate instrument. After Margent had run the various curves, he pointed out to me that the electron tubes in the transducer had been dead all along. There wasn't even any power source provided for them; the only power the instrument was using was going directly to the image-orthicon. To prove it, he pulled all the tubes out of the chassis. The thing still functioned."

"That can't be," Ni said, sitting up abruptly.

"I can testify that it can be; it

happened. And that isn't all. The next thing he did was to slide the chassis out of the apparatus entire, and substitute a wiring diagram, attached to the orthicon leads with clips."

"And it still worked?" Ni demanded.

"It worked beautifully."

"Then it's nothing but a conjurer's cabinet," Ni said harshly. "I'm sorry, Aidregh, but they're making game of you. The whole thing is a hoax; it can't be anything else."

"A hoax for what purpose?" Aidregh said. "Margent knows that we're all under a sentence of death, dated day after tomorrow. Why would he be killing time playing parlor games to fool me?"

"He's trying to frighten you into accepting his terms—"

"Nonsense; I've already accepted them. All he asked us to do was to undertake this training. Besides, Ni, that wasn't the only such demonstration that I saw. All the machines in that tent were analytical devices of one kind or another. There was one that behaved rather like a spectrograph. Margent put a piece of live lung tissue into it, and it gave him back an analysis, by weight, of every chemical element in the sample, including the gases trapped in the alveoli. Then Mareton shook up a stack of five gross of cards, each one of which was marked with the *symbol* of one of twelve chemical elements, and gave the machine a random fifth of the cards to scan

—*inside a lead tank*. The machine analyzed the distribution of the symbols just as promptly, paying no attention to what elements went to make up the paper of the cards, or the lead in the tank walls. It will also give a chemical analysis of an object working from a photograph; I saw it do that, too."

"And then," Dr. Ni said with deep disgust, "Margent busted all its tubes, cut all its connections, and immersed it in thick, electrolytic glue—and still it functioned. Eh?"

"Not at all," Aidregh said, trying to conceal his sudden, exhausted irritation. "You can't cut the connections on such a device, no matter what they're made of. That was part of the demonstration. Devices that handle any *voisk* force don't need any power from the electromagnetic spectrum, but they do depend utterly upon connectivity. The laws they obey don't follow the quantitative rules of physics; instead, they're wholly topological. You can rob such a device of its power-pack, or of miles and miles of copper wire, or of whole sets of components, and they'll still work. But you must supply some token connection to take the place of the connection you've broken. If the device is operating from a wiring diagram, and you erase one schematic lead, one line on the paper—floom! The thing goes dead."

"Ah," Dr. Ni said, no less du-

biously than before, but with less tension in his voice. "Well, that makes a little sense now—a very little. It's still pretty mystical, Aidregh. But then, I . . . I never did understand topology very well, I must confess."

"I'd barely even heard of it until today," Aidregh said. He was forced to stop suddenly and stifle a yawn. Exhaustion was pouring over his brain like a torrent of smooth ink; he would be obliterated utterly in a moment. "But it seems to be vital here. And there's this: what counts is the topological manifold *in the mind*, not in the machine. The machines are just crutches, for me, because I need crutches; the time left is too short for me to learn how to do without them. But sooner or later, they have to be discarded; sooner or later, like any crutch, they only get in the way."

This time the yawn caught him unawares. He fell back among the cushions, the whole world hurtling whirligig in whistling hurrahs around his humming head.

"Ni . . . excuse me . . . good-night—"

In scarcely another second he was asleep, in a black nightmare in which children cried and would not stop; and then, light was spilling into his eyes again, and someone was shaking him gently. It was Mareton.

"Wake up, Aidregh," the Ratheman said stolidly. "This is our last day."

IX

The first half of the day was a blur. Though Aidregh's nerves were on a hair-trigger from lack of sleep, his memory for small incidents seemed to be almost drugged, so that within five minutes after some new project had begun, he could recall only vaguely what the last one had been.

And there were all kinds of emotional undercurrents which he could apprehend without identifying. He was seeing other Rathemen beside the Margents and Mareton now, and most of them did not bother to conceal their hostility. He was convinced that few of them would have spoken to him at all, were it not for the overwhelming authority of the Margents.

But the training proceeded, now on a level where the experiments and tests made almost no sense to him. Evidently they had wanted his conscious understanding only of those points which had been demonstrated to him yesterday. Now, instead, they were drilling him, teaching him by rote, and did not care whether he understood the material he was learning or not. Nor was it his memory they were drilling, but some other part of his mind, of the very existence of which he was unaware; he knew only that he did not know.

Many of the exercises, however, plainly required the use of some kind of judgment or discrimination, although from what basics he again



could not say. He was shown a tightly rolled scroll and asked to throw out an emotional reaction to the argument written on it, regardless of the fact that he did not even know what the subject matter was. He was shown a photograph, on glass, of some nearly transparent and quite shapeless object, and told to give it two names—a familiar and a formal one. He was given a set of tones to listen to, and asked to select out sequences which might apply to himself, to Dr. Ni, to the children, to Margent. And above all, he was shown Rathemen, scores of them, and was told to talk to them, subject matter unimportant, while the Margents and Mareton closed their eyes and listened as though his every banal word might

conceal some universal truth. Sometimes the outcome—always undetectable to Aidregh—seemed to please them. More often, it did not. But gradually, the incidence of successes or partial successes seemed to be increasing.

This would have encouraged Aidregh, had he had some idea of what he was succeeding at.

In the end he was forced to form his own analogy, since the Rathemen would offer no explanation at all. It seemed to him that what he was being trained in was something akin to spot diagnosis—that art of the born physician who looks at the patient and *knows* what the man is suffering from, eliciting the physical signs of the disease to be thorough, but invariably getting

confirmation from them of his first three-second guess. The analogy disturbed him, since it again raised the question of his wisdom in refusing to let Dr. Ni take his place.

Still, Ni had no special reputation as a diagnostician; perhaps he was too much of a skeptic. Besides, there was no way of knowing whether or not the analogy was correct.

"Enough," Margent said sharply. "The last six responses have been sterile repeats. There is simply no point in going any farther."

Aidregh looked up at the Rathe-man, his heart freezing solid.

"So soon?" he whispered.

"I am afraid so. I am a little surprised myself. But we have exhausted every training device we can bring to bear in so short a period; the pattern now is fixed."

"Hopelessly?"

"Nothing is hopeless," Margent said. "But the rest must be up to you."

"I don't understand."

"You have the trick in some measure now," Margent said. "You know what it is, and you can use it consciously—that is, at will. What this means is that you now have a crude but effective technique—and technique is all that anybody can be taught. How well you use the technique, and how powerful it is in your hands, is entirely personal. We cannot teach you that. All scientists know scientific method, but only a few make great discoveries; all musicians can read music, but not all

write great music. It is like that."

"I see." It was not as bad as he had supposed when Margent had called the halt a few moments ago, but it was bad enough. "But Margent, if those analogies are sound, you must have some estimate of my talent. Teachers always develop such an estimate. What is it?"

Margent looked at him gravely. "Such estimates are more often wrong than right, as I see you know."

"That's perfectly expectable. Nevertheless, I want to hear yours."

Margent seemed to commune briefly with his alter egos, and then spoke decisively. "As matters stand now, you should be able to sway a small group, particularly if that group is made up of persons who do not know what it is that you are doing—as would of course be the situation anywhere on your planet. But the impulse is weak at the source. To carry absolute conviction, it will have to develop much greater force, and there we cannot help you at all, or tell you how to do it. Either you have the resources or you do not. We cannot know."

Aidregh thought a moment. "How about machine amplification?"

"Perfectly possible," Margent admitted. "But of no value. It does not improve a bad piper to make his pipe sound four times as loud. You must improve the man—which cannot be done by machine. It can-

not be 'done' at all; the man himself must do it, no one else."

Abruptly, there seemed to be some sort of argument, almost a quarrel, going on among the Rathemen. Mareton said, "Test?" and two or three Margents spoke at once, then Mareton and several more Margents, then the first Margent again—all in single cryptic explosions of words, all the more difficult to follow because they were spoken in the Rathe tongue.

Destructive. Crucial time. Conditions. Tension. Cluster. Favorable. Not so. Mass opposition. Critical factors. (Unknown word.) Present it? Just. Affirm. Affirm. Affirm. Affirm—Agreed.

"We think," Margent said, "that you should be asked if you will give a concert."

"A—concert?" Aidregh said, goggling.

"Yes. The word is a poor one for what we have in mind, but it is the closest we can come in your language. It is meant to convey that the only way to assess talent is to show it before an audience. Tomorrow, if you are willing, we can give your gift the most critical examination it is ever likely to be asked to sustain. The circumstances in the stars are peculiarly right for it, as my colleagues remind me. Would you consent?"

"You want me to . . . to give a speech? Before a Rathe audience?"

"Exactly. If you can sway them, you can carry your own world by

acclamation. Especially with the stars situated as they are now."

The idea was breath-taking, and more than a little terrifying. Somehow, too, the references to the stars were almost as unsettling as the proposal itself. Nothing that he had experienced on Rathe had increased his confidence in astrology one iota; Margent's implicit endorsement deepened the air of unreality which had always been the chief obstacle to his learning anything at all from the Rathemen.

"It will be dangerous," Margent added. "The hostility will be considerable. Many, perhaps a majority, will be waiting to see you fail. And if you do, you will almost surely have to be helped down from the podium."

"Why?"

"Because of the reaction. It would probably leave you something less than an idiot."

"If I fail, I'll welcome losing my mind," Aidregh said, with bitter conviction. "And what if I succeed?"

"There the reaction might be important to you. Possibly it would advance your power and control by some years; confidence is important in these matters. But it will not be easy."

"I'm sure it won't," Aidregh said grimly. "But I'll try it. Of course."

The amphitheater on the far side of Rathe was so vast that it had even shown on the photographs Captain Arpen had taken; the Home

assessment team had taken it to be an ancient meteor crater. The heaped terraces, which were now filling with robed Rathemen, seemed like the engineering transformation of immense talus-slopes. Looking upward from the center of the bowl, Aidregh tried to estimate the number of Rathemen who were already occupying those stony benches, and failed. The total was easily above half a million, but how much above it he could not begin to guess. The floor of the crater alone might have held a small town. The dyed robes moved like dots in a color-television transmission, each one clearly picked out by the light of the Cluster, which was rising over the eastern wall.

"It has been many years since we last attempted anything even resembling this," Margent was saying. "The omens for it are good, but I misdoubt the reading a little. So much of it is without precedent, and we have lost so much in fifty years of regression."

Aidregh said nothing; he was almost totally preoccupied with what he was going to say. On a bench six tiers up he could see Aidresne, Corlant, and Dr. Ni; he had been unable to exchange more than a few words with them, but he had tried to be reassuring. As a first test of his trick, it had not been successful; their foreheads showed furrowed and wan above their respirators. If there was anyone else from the Home expedition here, he could not spot them.

The movement along the great stone steps had almost ceased now. The amphitheater was full. The Cluster continued to rise, occupying half of what sky could be seen from inside the amphitheater's walls, and filling the rest with glare. It was like being at the bottom of a hot, shallow tropical sea, whose waters were rippleless, shadowless white light. The thin air was motionless.

"We are ready to begin," Margent said.

After a moment's hesitation, Aidregh stepped onto the pure white slab which was to be his podium. Though the acoustics of the amphitheater would have made his voice reach to the topmost benches, he could not speak in the air of Rathe; he had a tiny microphone inside his respirator. The respirator would also mask any expression, however impassioned, his face might wear.

The thousands upon thousands of Rathemen looked down upon him, motionless, unspeaking; the great bowl was utterly silent. At Aidregh's side, Margent seemed to be carved from stone. The sky was full of flame.

"I expect to succeed," Aidregh told them. "I expect this because you can do no more for me than what you have done. You are not gods, and you have not proposed to solve all our problems for us.

"Whether or not I succeed depends upon me, not upon you. It depends upon my alertness, my devotion, my purity of intention.

There could still be war between us—perhaps not immediately, but in a few generations. You cannot make it impossible for me to choose anything but peace, for that would be as ruinous for you as war tomorrow would be. You must leave me the conscious choice, because these decisions are evolutionary turning-points for you, as well as for us.

"If we—Rathemen and Home-men—survive this crisis, I am perfectly prepared to devote the rest of my life to making another one impossible. Nothing less will serve. But we have already served one another well, and we will continue to need each other in the years to come—as long as the question of the Third Race is unsolved.

"By this I mean the race that landed on the planet we call Nesmet, before either we or you did. Do you know more than we do about them, which is nothing? I think not. But their camp was plainly an observation station, just like yours and ours. Who could they have been looking at but us—both of us? And why?

"We may have to be glad—*both of us*—that we each built weapon emplacements facing outward from each other. We may have to shoot in that direction some day. I know that your faith in that kind of defense is very limited; but suppose we were to combine our very different approaches to the real universe—whatever that may be—and develop them in co-operation? I think we are fortunately situated

for it, though we have our hands on each other's throats for the moment. Our researches in physics are not likely to interfere with your studies in the *voisk* spectrum if we do not force them upon you, as we have done up to now. But you may well find applications of our findings that you might never be able to discover for yourselves. The obverse holds true for us.

"Any Third Race that approaches our system with unfriendly intention thereafter may find such an approach highly unwise."

He paused, though he did not want to; breathing inside the respirator was difficult after a prolonged speech. As he struggled to calm his chest, he became aware that something was happening. He could not tell what it was. Nothing had changed, and yet there was a sense of enormous purport in the air around him, as though invisible agencies and powers were moving through it upon some unguessable business. The Cluster was now directly overhead, a supernal mass of star-fire shutting out the whole of the sky. The feeling in the air was something like a wave of mass emotion, such as he had felt once or twice from mobs; yet at the same time it was like moving ungrounded through a powerful electrostatic field, with the hair standing up, nimbuses crackling on the fingertips, the sense of being within a step or a spark of death—and yet, nothing was moving, nothing but shadows.

Shadows! With a sharp hiss of indrawn breath, Aidregh looked up. It was true.

His own world of Home was eclipsing the Cluster. The vortex of star-fire was already eaten away by almost a third.

So this was what Margent had meant by saying that the stars were favorable! There was already a chill in the air, not just an affect, but a real drop in the temperature. Rathe was throwing its heat back into interstellar space, cut off from the major source of its warmth by the ultimate, threatening blackness of Aidregh's world.

"But what," Aidregh said steadily into the deepening gloom, "what have you given me? You are sending me Home with a gift that no man on my planet can resist. You have taught me nothing of the principles involved; you have given me only the smallest of clues which might lead me, or men much more intelligent than I, to the *voisk* forces which you value above all others. I know that we have centuries of new learning to encompass before we begin to know what the *voisk* spectrum might be like.

"In the meantime, you have given me a trick. You have given a savage a force that no one of his fellows can resist, and sent him irresponsibly home to play with it—or make himself king of his world with it. You have done this to preserve your own safety. How long will you be safe while savages play

with the *voisk* force? *How long will you be safe from me?*"

No one moved. The darkness grew; neither the red sun nor the white could pass the high ramparts of the amphitheater. The Soul and the Breath were gone, and the Mind was going. Aidregh, even as he spoke, could remember nothing but himself as a twelve-year-old cadet, cut off from civilization with a small squad in a forest, minding a water-cooled searchlight. They had left the light pointing at the sky while they had cooked their field rations, and when they had come back to it, two hours later, the water in the cooling coils had been frozen solid—all its latent heat radiated off from the paraboloid mirror into Nowhere. That had been his first contact with deep space, right on the earth of his own land of Thrennen; and now he was standing at the focus of another, vaster mirror, while the blackness spread above it. . . .

"You may well fear me," he said into the total night. "With the gift you have taught me to use, I can be more dangerous to you than my whole planet was, when we had nothing with which to threaten you but bombs. Your only hope, now, is to co-operate with us to the fullest. You will never again feel safe in confining any man from Home here while you teach him certain minor tricks. The floodgates are open. The flood will follow.

"But I will make you one prom-

ise, which I owe you for all the damage we have already done. The promise is this: After I have swayed my people away from this war, I shall resign. No politician should use the trick you have taught me more than once, and then only for what he believes to be an ultimate cause.

"But I shall not promise to refrain from using the trick again. I will use it. I will spend the rest of my life using it—but not as First Minister of Thrennen.

"This I promise, and that I say I will not promise. You have heard me. I have done more than try to sway you by the trick you taught me. I have told you what I intend. I have nothing more to say; judge now, Rathemen."

He stood in the utter darkness on the stone, without a single star over him. The intangible, inaudible stress in the air was still growing, swelling to some crescendo he would never understand—

And then, just like that, it was gone. A thin, slivery veil of the Cluster peered wanly into the crater.

The stone benches were empty.

He had lost his audience—lost it as no man in history had ever lost an audience before. Of all that vast congregation, no one was left but Dr. Ni and the children. No, there was one other group, far away along the stony reaches, but they were Homemen too—the crew, evidently.

Aidregh felt his knees buckling. Somehow, Ni got to him before he

hit the ground beneath the white stone.

"Aidregh! What's the matter? Was it so hard? Corlant, Aidresne, quick. He's as limp as a rag. Aidregh, we're all here . . . it's all over . . . you did it, you did it. The war is over . . . it's over, can't you hear me?"

"I hear you," Aidregh said, groping to a sitting position. "But—It's over? They're gone! They didn't stay to listen! Ni, Ni, we've got to get away somehow . . . the bombs will be arriving in a few hours—"

"No, no, Aidregh. We're free. That's why the Rathemen are gone. The whole crew is here. We can go—and you did it."

"We're already sending notice of our release to Signath," Corlant said. She was kneeling beside him, her eyes brimming with tears. Aidresne stood over them both, looking both solemn and proud. "You didn't see Margent when the light first began to come back. He bowed to you. They all did. And then they all flicked out like a light—they gave us our freedom, by leaving us alone."

Aidregh stood up unsteadily, feeling his son's solid forearm rock-steady under his own. Ni was already leading the way up the nearest aisle, out of the vast deserted crater.

Outside the walls, the shadow of the amphitheater's ramparts was being thrown across the gleaming desert by the setting Cluster. A phalanx of jointed groundcars was

drawn up on the salt flats of some old sea, and from them Aidregh could hear a susurrus of voices speaking in the accents of Home: his crewmen, waiting. He began to hurry.

"Aidregh?" a voice said from behind him.

"Yes, Ni."

"What now?"

"Deal with Signath," Aidregh said.

"Yes, but then? Do you really mean to give up the Ministry?"

"Yes," Aidregh said happily, rounding a sharp turn in the path by vaulting over a boulder. "I'm going to try something new. I won't dare be a politician any longer—I'd be a monster in nothing flat. I'm going to strike out for myself."

"How?" Ni demanded.

Aidregh stopped at the bottom of the winding path and looked out toward the waiting cars. Corlant took his hand, and Aidresne took hers.

"Wait and see," he said; and suddenly they were running, all three, whooping with joy, along the salt flats toward Home. He stood for a moment and looked after them, shaking his head, and then broke into a reluctant dogtrot.

It was like a kind of dance, with the sighs and shouts and drumming feet of the crowd for music. On the platform, far away at the center of the huge pavilion, Aidregh moved from one edge of the boards to another with desperation, his legs

moving loosely, his arms flapping, the white blur of his face turned appealingly to the tented sky and then to the swaying audience.

Corlant and Aidresne could hear his voice, but not what he was saying. Only the wavering sound of someone shouting penetrated this far through the sea-roar of the crowd.

Aidregh fell on his knees at one border of the stage and held out his arms. A great groan of orgiastic sorrow spread from the people closest to that side of the platform, beating its way outward through the pavilion like a wave of contagion. It was still coming toward Corlant and Aidresne like a foaming comber when Aidregh was on his feet again, striding toward the tent's center pole, his fist raised at the pole, and then at the sky. After a moment's hesitation—which compelled instant silence at the center of the audience—he rushed on to seize the ridge-pole itself, in what was apparently an insane effort to wrest the immense duralumin mast bodily out of the ground.

The whole crowd was on its feet in an instant, screaming:

Get out of our sky! Get out—

On the stage, Aidregh clutched at the mast and turned slowly, looking out at the roaring mass of voices and fists. His face was blank, except for a small black O where his mouth should have been, but it was perfectly plain what his stance meant. The words of the chant seemed to drive him back like blows,

until he was standing only with the greatest effort.

The chant began to falter. Aidregb's head was resting against the ridgepole, rocking a little as though every shout was a slap. His whole body was doing a dance of torture, and yet at the same time it did not seem to be moving. A horrified Ahhhhh! rose into the middle of the chant and broke its rhythm; it died away rapidly. In the silence, someone began to weep.

Aidregb had tempted them, and they had fallen. The old orgy of fury against the sky had broken out again, only because he had called it to their memories. Now they saw what their passion had cost them. The air of the pavilion was thick with shame.

The First Minister of Thrennen and his bride sat down, clinging to each other. They had not yet heard one intelligible word from Aidregb, but he had already wrung them dry—and knowing, approximately, how he was doing it seemed to be no protection. He straightened himself against the ridgepole with great

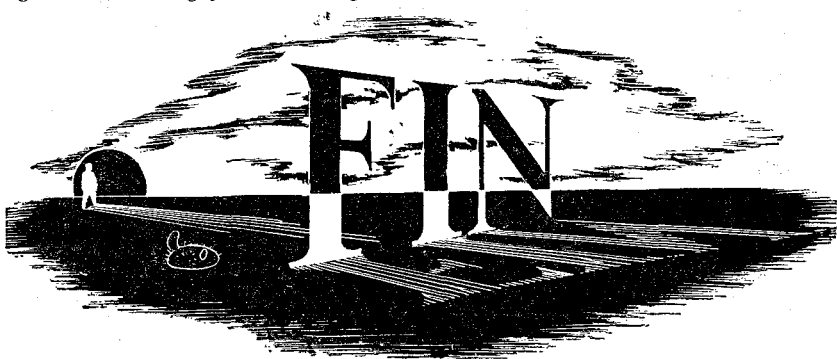
effort, and the pole seemed to stiffen with him, as though it were once more ready to undertake its immemorial task of holding up the familiar sky. He came forward with slow painful steps, lifted his far-away face—and looked directly into their eyes.

In the intent hush, he began to speak. Now they could hear the familiar voice, saying unfamiliar, mystical things, as befitted the Prophet of Rathe. But they knew that it was speaking to them.

"Children— There is still time—"

And indeed there was. Aidregb had made it for them, and, as the Prophet of Rathe, was in the process of making more. The new worship of the sister planet had already ousted Cluster-worship, and had become central in the doctrines of astrology. It took hold wherever Aidregb spoke.

"There is still time," he said. The congregation listened. "Here is where we and the grass grow up, like music."



THE WAR IS OVER

Ever try to answer the question "When should you stop hunting for something you're seeking?" It takes intelligence—real intelligence—to answer that question. But a not-very-bright entity can have a compulsion to seek something....

BY ALGIS BUDRYS

Illustrated by Freas

A slow wind was rolling over the dusty plateau where the spaceship was being fueled, and Frank Simpson, waiting in his flight coveralls, drew his nictitating membranes across his stinging eyes. He continued to stare abstractedly at the gleaming, just-completed hull.

Overhead, Castle's cold sun glowed wanly down through the ice-crystal clouds. A line of men stretched from the block-and-tackle hoist at the plateau's edge to the exposed fuel racks at the base of the riveted hull. As each naked fuel slug was hauled up from the plain, it passed from hand to hand, from man to man, and so to its place in the ship. A reserve labor pool stood quietly to one side. As a man faltered in the working line, a reserve stepped into his place. Sick, dying men staggered to a place set aside for them, out of the work's way, and



slumped down there, waiting. Some of them had been handling the fuel since it came out of the processing pile, three hundred miles across the plains in a straight line, nearer five hundred by wagon track. Simpson did not wonder they were dying, nor paid them any attention. His job was the ship, and he'd be at it soon.

He wiped at the film of dirt settling on his cheeks, digging it out of the serrations in his hide with a horny forefingernail. Looking at the ship, he found himself feeling nothing new. He was neither impressed with its size, pleased by the innate grace of its design, nor excited by anticipation of its goal. He felt nothing but the old, old driving urgency to get aboard, lock the locks, throw the switches, fire the engines, and go—go! From birth, probably, from first intelligent self-awareness certainly, that drive had loomed over everything else like a demon just behind his back. Everyone of these men on this plateau felt the same thing. Only Simpson was going, but he felt no triumph in it.

He turned his back on a particularly vicious puff of dust and found himself looking in the direction of Castle town, far over the horizon on the other side of the great plains that ended at the foot of this plateau.

Castle town was his birthplace. He thought to himself, with sardonic logic, that he could hardly have had any other. Where else on Castle did anyone live but in Castle town? He remembered his family's

den with no special sentimental affection. But, standing here in the thin cold, bedeviled by dust, he appreciated it in memory. It was a snug, comfortable place to be, with the rich, moist smell of the earth surrounding him. There was a ramp up to the surface, and at the ramp's head were the few square yards of ground hard-packed by the weight of generations of his family lying ecstatically in the infrequently warm sun.

He hunched his shoulders against the cold of the plateau, and a wish that he was back on the other side of the plains, where Castle town spread on one side of the broad hill above a quiet creek, crept past the demon that had brought him here.

The thought of Castle town reminded him of his father—"This is the generation, Frank! This is the generation that'll see the ship finished, and one of us going. It could be *you*, Frank!"—and of the long process, some of it hard work, some of it inherent aptitude, some of it luck, that had brought him here to pilot this ship into the stars.

And, having brought his reverie back to the ship, he turned away from the plains and Castle town, looking at the ship.

Generations in the building, and generations in the learning how before the first strut was riveted to the first former. The search, the world over, for a fuel source. Literally hundreds of exploring teams, some of them never coming back, disappearing into the uncharted lands

that surrounded the plains. The find, at last, and the building of the pile. The processing of the fuel that killed its handlers, no one knew why.

The ship, rising here on this plateau year by slow year, at the focus of the wagon tracks that led out to the orepits and the metalworkers' shops, where swearing apprentices struggled with hot melt splashing into the molds, and others tore their hands to tatters, filing the flash off the castings.

The hoist operators, hauling each piece up the side of the plateau because this had been the place to build the ship, up where the air was thin and the ground was thousands of feet below, and the patient teamsters, plodding up with new wagonloads, the traces sunk deep in their calloused shoulders.

Now it had all culminated, and he could go.

The crunch of gravel turned his head to his left, and he saw Wilmer Edgeworth coming up to him with the sealed, rusty metal box.

"Here it is," Edgeworth said, handing him the box. Edgeworth was a blunt, unceremonious man, and Simpson could not have said he liked him very much. He took the box and held it.

Edgeworth followed his glance toward the ship. "Almost ready, I see."

Simpson nodded. "The fueling's almost done. They'll rivet those last plates over the racks, and then I can go."

"Yes. then you can go," Edgeworth agreed. "Why?"

"Eh?"

"Why are you going?" Edgeworth repeated. "Where are you going? Do you know how to fly a spaceship? What have any of us ever flown before?"

Simpson looked at this madman in startlement. "*Why!*" he exploded. "I'm going because I want to—because I'm here, because the ship's here, because we've all of us worked ourselves to the bone for generations, so I could go!" He shook the metal box violently under Edgeworth's jaws.

Edgeworth backed several steps away. "I'm not trying to stop you," he said.

Simpson's rage fell away at the disclaimer. "All right," he said, catching his breath. He looked at Edgeworth curiously. "What made you ask questions like that, then?"

Edgeworth shook his head. "I don't know," he said. He was not so constituted as to be able to top his first climax. His biggest bolt was shot, and now his manner lost much of its sureness. "Or, rather," he went on, "I don't know what I know. But something—Something's wrong. Why are we doing this? We don't even understand what we've built here. Listen—did you know they found little towns, like Castle town, but much smaller? With little men in them, about three inches tall, walking on their hands and feet,

naked. They can't talk, and they don't have any real hands."

"What's that got to do with this?"

Edgeworth's head was wagging. "I don't know. But—did you ever look at the boneyard?"

"Who wants to?"

"Nobody wants to, but I did. And, listen—our ancestors were smaller. Their bones are smaller. Each generation, going back—their bones are smaller."

"Is that supposed to mean something to me?"

"No," Edgeworth said. The breath whistled slowly out between his teeth. "It doesn't mean anything to me, either. But I had to tell someone."

"Why?" Simpson shot back.

"Eh?"

"What's the use of that kind of talk?" Simpson demanded. "Who cares about old bones? Who looks in boneyards? The ship's the only important thing. We've sweated and slaved for it. We've died and wandered away into who knows where, we've mined and smelted and formed metal to build it, when we could have been building other things for ourselves. We've fought a war with time, with our own weak bodies, with distance, dragging those loads up here, we've hauled them up and built the ship and now I'm *going!*"

He saw Edgeworth through a red-shot haze. He blinked his eyes impatiently, and slowly the driving reaction to any obstacle was drained out of his bloodstream again, and he could feel a little sheepish.

"Sorry, Edgeworth," he muttered. He jerked his head toward the ship as the sound of riveting mauls came hammering toward him. The filled fuel racks were being plated over, and the long line of empty-handed fuel handlers was sinking down toward the ground, resting and watching the ship being finished.

"Well, I'm going," Simpson said. He put the metal box under one arm and walked toward the ship's ladder, passing among the men who rested on the ground. None of them looked up at him. *Who* went didn't much matter. It was the ship they were interested in.

The inside of the ship was almost all hollow shell, latticed by girders converging on a series of heavy steel rings. Shock-mounted in the cylinder of free space inside the rings was a hulking, complex machine, full of hand-drawn wires and painstakingly blown tubes, all nestled together in tight patterns, encased in fired clay, and wrapped around with swaths of silicone rubber sheeting. Heavy wiring ran from the apertures in the final shield of pressed steel, and joined the machine to a generator. Other wires ran to posts projecting from the inner hull plating. Nobody knew what it was for. A separate crew had built it while the hull sections were being formed, taking years at the job. Simpson looked at the shield seams, and realized the word for that kind of process was "welding."

Below the main compartment

were the engines, with their heavy lead bulkhead. "Now, what's *that* for?" he remembered asking when he saw it being levered into place.

"Buddy, I don't know, and I specified for it." The crew foreman spread his hands helplessly. "The ship just . . . wouldn't feel right . . . without it."

"You mean it wouldn't fly without a ton of dead weight?"

"No. No . . . I don't think that's it. I think it'd fly, but you'd be dead, like the fuel-handlers, before you got there." The foreman shook his head. "I think that's it."

In the nose of the ship, hanging over Simpson's head as he clung to the interior ladder beside the air lock, was the piloting station. There was a couch in gimbals, and there were control pedestals rooted in the tapering hull and converging on the couch. The nose was solid, and Simpson wondered how he'd seen out. He suspected there'd be some way. With one last look around, he clambered up the ladder and into the couch, moving awkwardly with the box under his arm. Once in the couch, he found a frame jutting out of its structure. The box fitted it exactly, with spring clips holding it fast.

He settled himself in the couch, fastening broad straps over his hips and chest. He reached out tentatively, and found all the controls in easy distance of his fingers.

Well, he thought to himself, I'm here and I'm ready.

His fingers danced over a row of

switches. In the belly of the ship, something rumbled and the wan emergency lights went out as the operating lights came on. A cluster of screens mounted over his head, inside the gimbal system, came to life and showed him the outside, all around and fore and aft. He took his last look at the plateau and the watching men, at the sky overhead and the plains behind him. Up here in the ship's nose, that much higher above the plains, he thought he could just make out Castle town's hill.

But he had no time for that. His hands were flying over the controls. Ready lights were flashing on his board, and somewhere in the forest of girders behind him, auxiliary motors were working themselves up toward full song. He pulled the operating levers toward him, and the massive engines began to growl. He tripped interlocks, and more fuel canisters began sliding down their racks, slipping into place. His mouth opened, and he began to heave for breath. He felt the ship tottering, and felt panic flash through him. In the next instant, calm settled on him knowledgeably. It was all right. The ship was just breaking loose. It was all right, the ship was all right, and he was going. At last, at last he was going.

The after screens were blank with the haze of burning sand. The ship rumbled up into the sky, incinerating the watchers on the plateau behind it.

He had never, never in his life

imagined that anything like this lay beyond the sky. There were no clouds, no curtains of dust, no ripples of atmosphere, no diffused glows of light. There were stars and nothing but stars, with nothing to veil them, strewn over the black in double handfuls, forming themselves into coagulating spirals and sheets of light, gigantic lenses and eggs of galaxies, sun after sun after sun. He stared at them open-mouthed, while the massive ship charged at them, completely bewildered. But when the time came to trip controls he had heretofore left scrupulously alone, he did it precisely and perfectly. The machine, nestling in the girders behind him, gulped at power from the generator, surged it through into the hull, and in an instant in which he saw quite clearly why the ship had needed so much internal bracing, he was in hyperspace. He ran through it like a man on a raft on a broad river at night, and then he was out again, with alarm bells exploding through the hollow ship, and hull after gigantic interstellar spaceship hull occluding the new stars around him.

He cut off all power except signal circuits and lights, rested one hand protectingly on the metal box, wondering what was in it and where he'd come, and waited.

Simpson pushed through the inner lock hatch into the Terran ship and stopped, looking at the two aliens waiting for him.

They were smooth-skinned and

tannish-white, with soft-looking fibrous growths trimmed into shape on their scalps. "Soft-looking" was a good general description, too. Their skins were flexible as cloth, their faces were rounded, and their features were muddily defined. Soft. Pulpy. He looked at them with distaste.

One of them muttered to the other, probably not allowing for Simpson's range of hearing: "Terran? From *that*? I don't believe it!"

"How'd he understand enough to get in here, then?" the other snapped back. "Be yourself, Hudston. You heard me using the phone. He's got a terrible accent, and some odd idioms, but it's Terran, right enough."

Simpson deciphered their mushy intonations. He should have been angry, but he wasn't. Instead, there was something welling up in his throat—something buried, something that had begun not with him but with generations past, bottled up for all this time and now bursting out:

"The war's over!" he shouted. "It's all over—we've won it!"

The first Terran looked at him in astonishment, one eyebrow raised. "Really? What war is that? I wasn't aware of any."

Simpson felt confused. He felt empty, too, and bewildered at what had erupted from his larynx. He didn't know what answer to make. He waited for himself to say something new, but nothing else came. Uncertainly, he offered the metal box to the Terran.

"Let's see that!" the second Terran said quickly, snatching it out of Simpson's hand. He stared down at the lid. "Good God!"

"What is it, admiral?" Hudston asked. The second Terran wordlessly showed him the stamping on the lid, which had never meant anything to Simpson or anyone else on Castle.

"T.S.N. Courier Service?" Hudston spelled out. "What the deuce—Oh, of course, sir! Disbanded in the Twenty-fourth Century, wasn't it?"

"Late Twenty-third," the admiral muttered. "When the hyperspace radio network was completed."

"Four hundred years, sir? What's *he* doing with it?"

The admiral was fumbling with the box. The lid everyone on Castle thought was sealed sprang open. The admiral pulled out a sheaf of crumbling maps, and the leather-covered book that had been under them. Neither of the Terrans was paying any attention to Simpson. He stirred uneasily, and saw several short rods in the compartment wall swing to follow his move.

The admiral brushed carefully at the book's cover. He peered down at the gold-stamped lettering. "Official Log, TSNS *Hare*. All right, now we're getting somewhere!" He thumbed gingerly through the first few pages, silently showing Hudston the date, shaking his head, then going on. "Routine stuff. Let's get to the meat, if there is any." He stopped and looked at Simpson again for a moment, shook his head violently, and resumed searching

through the pages. Then he said: "Here it is, Hudston! Listen:

"Proceeding at full speed, course for Solar System. All well,'" he read. "'At 0600 GST, Eglin Provisional Government concluded truce pending armistice. Signatories were—' Well, that doesn't matter. They've all been dust a long time. Let's see what happened to him." The admiral paged forward. "Here we are. Here's the next day's entry. It's interrupted here, you'll notice, and finished later: 'Proceeding at full speed, course for Solar System. In hyperspace. All well. Estimated Time of Arrival, Griffon Base, +2d., 8hrs.'"

"Notice the squiggle here, Hudston—he must have jerked his arm. Now: 'Resumption of log: Chance encounter with Eglin picket boat, apparently ignorant of truce, resulted in severe torpedo damage Compartments D-4, D-5, D-6, D-7. Ship out of control. Engines and hyperspatial generator functioning erratically, and ship definitely off course, though navigation at present impossible. Have sustained superficial burns and simple fractures, right leg and left arm.'"

"Here's the next day's entry: 'Ship still out of control, and engines and generator continue erratic. Almost all ship's instruments sprung or short-circuited by explosion shock. Navigation impossible. Ship now falling in and out of hyperspace at random intervals. Attempted shut-off of generator with no success. Suspect complex progressive damage to co-ordi-

nator circuits and tuning grids.'"

"Why didn't he call for help, sir?"

The admiral glared at Hudston. "He couldn't. The reason he was out there in the first place was because they couldn't communicate faster than light, except by couriers. He was stuck, Hudston. Hurt and trapped. And that, by the way, is the last entry in the official log. The rest of it's a short journal:

" 'Crash-landed about 1200 GST on small, uninhabited, unknown planet. The constellations don't make any sense, even by Navigational Projection. I'm down here for good.

" 'The ship went to hell when I hit. Now I've got two broken legs, and some gashes. Got the medkit out, though, so that's not much problem. Not right away. I'm losing blood inside, and I can't figure out how to put a Stedman splint on that.

" 'Did some exploring this afternoon. From where I am, this place looks like nothing but grass, but I saw some mountains and rivers before I hit. It's cold, but not cold enough to bother, unless it's summer now. Maybe it's spring. I'll worry about winter when I get to it.

" 'Wonder how long it's going to be before Earth finds out the war's over, now?' "

Simpson's head jerked. There were the words again. He felt more and more confused, and more and more listless and empty. He should have been interested in this ship, and in these people. But he only turned his

head perfunctorily, and neither the smooth, massive bulkheads, glowing with their own light, nor the two Terrans in their scarlet uniforms, seemed to be able to make much real impression on him.

He was here. He'd made it. And he didn't seem to care what happened next.

"There's not much more to the journal," the admiral was saying. " 'Feel pretty rocky today. Not much doubt about it—I'm losing more than I can stand. Been eating Prothrombin bars like candy, but no help. Running out of them, anyway.

" 'Food'd get to be a problem, anyway. There doesn't seem to be anything I can eat on this place, except for some little things that look like a cross between a prairie dog and a lizard. Take about two dozen of them to make one breakfast.

" 'No use kidding myself. If my AID can't hold my insides together, Vitamin K isn't going to do it either. Food doesn't turn out to be a problem after all.

" 'That brings me to a pretty interesting thought. I've got this piece of information, and an AID's supposed to live inside you and see it gets through. Never thought about it much, before. Always managed to deliver my own messages. But here's this thing, now, that's half-alive in its own right, living inside me. It's built so it's *got* to see that any information I have gets to the right people. I've even heard of AIDs jumping out of a man and crossing over to an Egg, and mak-

ing *him* bring the message in. They're smart as hell, in their own way. Nothing stops 'em. Nothing shuts 'em off.

"Well, here I am God knows where, all by myself, where nobody'll ever find me. If I had a ship, I could just get in it and go. Bound to hit Federation territory sometime. But I haven't got a ship. I haven't even got much of me. I wonder what the AID's going to do now."

The admiral looked at Hudston. "That's the end of it. It's signed 'Norman Castle, Ensign, TSN,' and that's the end of it."

Hudston looked casually at the admiral. "Fascinating," he said. "That *was* quite a problem for his AID, wasn't it? I suppose, with the crude model he must have had, it simply died with him."

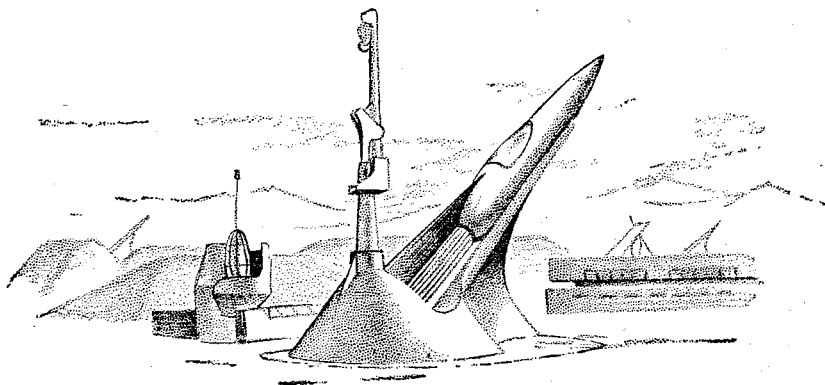
"AIDs don't die, Hudston," the admiral said slowly. He closed the

old logbook, and his face was twisting under the cumulative impact of an idea. "If you've got one AID, you've got a thousand. And they never give up," he said, his voice dropping to a whisper. "They're too unintelligent to give up, and too shrewd."

He looked at Simpson. "Though I don't suppose that one had progressed far enough to have a time sense. Not a real time sense. Not one that could judge when its mission was obsolete." He shook his head at Simpson. "The war's over," he told him. "It's over a long time. But thanks, anyway. You did your job."

Simpson didn't hear him. He felt empty. The demon was gone out of him, and he felt his mind closing in, losing interest in things that were important to men. He was down on the deck, on his hands and feet, tearing at his clothes with fretful jaws and whimpering.

THE END





THE REFERENCE LIBRARY

BY P. SCHUYLER MILLER

A FIELD THEORY OF PSI

Some time in the near future, G. D. Wassermann of the Department of Mathematics at King's College, Durham, England, will publish a book in which he proposes a mathematically developed field theory to account for the observed development and behavior of organisms, including what we know as "psi" or "ESP." When that book appears, I doubt that I will be able to review it: perhaps John Campbell can turn it over to someone with the mathematical qualifications to follow the argument through. But, thanks

to a kind of preview of his theory that Wassermann contributed to a symposium on ESP, held more than a year ago in London, I can tell you now what it's about.

The symposium was one of a series of similar discussions on aspects of medicine, underwritten by the Ciba Foundation. (Ciba is a Swiss pharmaceutical house that for many years has backed top-rank scientific work of this kind.) The proceedings of the week-long program of papers and discussions have been published in a small volume entitled "ESP—Extrasensory Perception" on the jacket, and "Ciba

Foundation Symposium on Extrasensory Perception" on the title page. A. S. Parkes, chairman of the Symposium, has his name on the jacket; inside, G. E. W. Wolstenholme and Elaine C. P. Millar are credited as editors. The American publisher is Little, Brown and Company of Boston; the price for 240 + ix pages is \$6.00.

Although I found the book the most solidly informative thing on the current status of research on ESP, that I have read, it is also rather disappointing in what it doesn't do. You will find nothing on psychokinesis—which may or may not be involved in the operation of the psionic machines with which John Campbell is experimenting—and in place of it you will find a couple of papers on pigeon homing, which seem to this layman, at least, much less substantial fare for an international conference that brought participants from Paris, Spain, Utrecht and the United States, as well as from all over England. It also seems unfortunate to me that Dr. J. B. Rhine of the Duke University Parapsychology Laboratory was not there to participate and especially to comment on criticisms of his experimental techniques and conclusions. Duke was, however, represented by J. G. Pratt, and the membership of the symposium included such key figures as S. G. Soal, Rhine's opposite number in British ESP research, and G. Spencer Brown of Oxford, one of the outstanding critics of the statis-

tical validity of the work. (Brown emerges in the discussion as much less the carping critic for the sake of disagreement than he has appeared in newspaper and magazine accounts of his objections.)

Each day members of the symposium presented papers, after which the sessions were thrown open to rather free-wheeling discussion of the papers and points arising from them. The discussions evidently continued after hours, and in some cases apparently more fruitfully than in the meeting room, but these were not recorded and no attempt was made to summarize them. (The same flaw can be found in most scientific colloquia of this kind, where the best and most productive discussion goes on outside the formal program. Need I say that this is also true of science-fiction conventions?)

R. A. McConnell of the Department of Biophysics here at the University of Pittsburgh opened the conference with a clear summary of the kind of evidence on which the concept of extrasensory perception is based. This was evaluated, and the sources of opposition pointed out, in other papers. Next day Wassermann opened with an abstract of his field theory, Brown again raised his statistical objections and Soal also dealt with the statistical question. The third day was devoted to "spontaneous" cases of extrasensory perception, especially some very striking results obtained with Spanish peasant girls, and to cases of

conscious and unconscious simulation of ESP. The fourth session was given over to the pigeons, and the fifth and last was a kind of philosophical and psychoanalytical summing up.

It is interesting to me that the newspaper accounts of the symposium—which appeared primarily as comments on the book, last summer—dealt at some length with the familiar opposition of psychologists and physical scientists, and said nothing at all about Wassermann's paper, *which would give the whole psychic field a physical-mathematical basis*, quite as tenable as that of quantum mechanics. Whether this means a pre-judging of the validity of Wassermann's theory, or a desire to wait until the whole treatment is on the record, I don't know.

Briefly, Wassermann suggests that there may be a system of fields, mathematically equivalent to electromagnetic fields, matter fields, gravitational fields, and the other fields which are now accepted and used effectively in theoretical physics, which will account for all the observed phenomena of living organisms: the mysterious "patterning" in the germ-cell, the development of that pattern in the maturing organism, the characteristic similarities and differences in behavior of different organisms, and among other things the phenomena of telepathy, clairvoyance, and—though here he loses me—precognition.

These postulated fields are de-

rived from Lagrangian functions which belong to the same mathematical class as the functions used for the energy fields of physics, and they have the same basic properties: (1) they exist permanently in a "stationary" state, with a specific energy level, unless disturbed; (2) they interact with each other and with other kinds of fields, and exchange energy according to specific quantum mechanical "selection" rules which determine when energy-exchanges can occur, and in what ways; (3) they may be "bound" to other fields and to each other, by falling into combined states with lower energy than either field would have by itself; and (4) they can duplicate themselves or arrange themselves in a way which copies another arrangement of fields. (This, you realize, is a paraphrase of Wassermann's paraphrase of his mathematical statements.)

Wassermann's fields are of several related kinds. He first discusses "M-fields" (M for "morphogenetic"), which "steer" the molecular fields of living matter from the egg to the adult. His concept permits a kind of "goal" for evolution or maturation, in the shape of an equilibrium energy state toward which the whole complex of matter and M-fields will trend. In nonliving matter, the associated M-fields and matter fields are in states where they cannot exchange energy, and hence cannot react on each other. However, once a specific level of molecular complexity has arisen—

presumably, at about the size and complexity of the viruses—the M-fields become “bound” to the molecular fields, energy exchange is possible, and the morphogenetic fields take up their function of shaping the growth and behavior of the molecular complex.

This, it would seem, may explain the living-nonliving paradox of the viruses, which may be at the crucial point in size and structure where a very slight change on molecular arrangement or energy states or both can throw them over from the “living” state, with bound M-fields, into an inanimate condition, where the M-fields are present but cannot react on the molecule.

A second set of fields, the B-fields—for “behavior”—are M-fields which react with the neural matter-fields of the organism—which have been developed under the steering of the M-fields—and then steer the behavior of the animal. Chemically and structurally different neurons will, naturally, bind different B-fields, and result in different behavior patterns. Instincts, learning, and memory, Wassermann says, can all be explained physically by the operation of these B-fields. (To illustrate very crudely, and in my own terms: the arrangement of atoms and molecules in the genes of a bird’s cells determines that certain M-fields will be bound to those genes. These M-fields steer the development of the egg into a bird with a specific kind of nervous sys-

tem. And this particular kind of nervous system binds a collection of B-fields, which make it sing certain songs, go through courtship dances and displays, build a specific kind of nest, and fly to Patagonia in the winter.)

Finally, there are Psi-fields. These are mathematically like M and B-fields, but have very narrowly spaced energy levels and can occupy very wide regions of space. Wassermann says that he can derive from their equations the property of transmitting energy for long distance without attenuation, and without its being absorbed by matter. This, then, offers a physical mechanism for action-at-a-distance and lack of screening, points that physicists find it hardest to swallow in ESP.

In telepathy, a B-field of the agent excites a Psi-field, which in turn excites the corresponding B-field in the percipient. Whether this takes place, depends on the total energy states of all the other B and Psi-fields in the system—that is, on the attitudes of the agent, the percipient, and quite possibly of other people in the room.

What we “see” when we look at something is the end product of a chain of field interactions: the matter fields of the object excite the electromagnetic fields we call “light,” and these in turn react with the molecular fields in the retinas of our eyes, and with the B-fields bound to those molecules, so that in the end you get a kind of one-to-one correspondence between the

matter of the object and the behavior-reaction of your B-fields. In clairvoyance, conditions are such that Psi-fields carry the energy rather than electromagnetic fields.

This fumbling dilution of Wasermann's mathematical theory is probably very confusing. I'm confused, too, and I am afraid the full mathematical treatment, when it appears, will bewilder me even more. But for our purposes, it seems to me that the important thing is that one mathematician, at least, sees an explanation for biological phenomena in essentially the same terms that physicists use to describe the laws of atoms and galaxies—and that ESP is an inherent part of the life-process.

THE COMPLETE BOOK OF SPACE TRAVEL, by Albro Gaul. World Publishing Co., Cleveland. 1956. 160 pp. Ill. \$4.95

This book, which World earmarks for "ages twelve and up," reached me very, very late. From your point of view, its value is in the page after page of illustrations by Virgil Finlay and the appendix of pictures of early spaceships—Godwin's "Man in the Moone" of 1638 through Verne, Wells, many other early rarities, down to Hugo Gernsback and 1929. The result is a big book in the Leyvon Braun tradition, but utterly unlike anything else that has come out. Some of the Finlay plates are ordinary (if he can be); some of the

more imaginative, such as his fantastic Bradburyan Mars-scape, his flying-saucer aliens, his Venusian explorer, and his Lunar selenologist are top-rank.

Albro Gaul is a biologist who has done other scientific books for the early teens. His text is clear, sound, logical, and imaginative. He seems to believe in intelligent Martians and flying saucer people.

It's a mighty handsome book, all 'round, and I think World would be selling more to school and public libraries and doting parents if they weren't charging more than Viking does for the Leyvon Braun-Bonestell series with the superb color plates.

SATELLITE! by Erik Bergaust and William Beller. Hanover House, New York. 1956. 287 pp. \$3.95

At first sight, this is the book we have all been waiting for, which will add up and spell out the development program that is going to put our first planetary satellites into space during the coming International Geophysical Year. If there had been no other books on rocketry and the rocket program, this would be a "must" for anyone interested in the field. It is sound, it is thorough, it is well written—but really, behind it all, nobody is willing to talk.

Hermann Oberth, in his introduction, says that in the book he found information that is nowhere in the technical papers on rockets. If so,

ASTOUNDING SCIENCE FICTION

it must be because of the governmental morass of secrecy which grew so sticky—Bergaust and Beller reveal—that two parallel satellite programs got well into the planning stage, one—"Orbiter"—a joint Army-Navy endeavor undertaken with much backing and filling and many misgivings about inter-service repercussions, the other the "Vanguard" program proposed by the American Rocket Society, taken up by the National Science Foundation, adopted by the Defense Department, and announced by the President. It seems incredible that, with Defense involved deeply in both programs, it should have kept the existence of the Vanguard project from the Orbiter group, and vice versa, but that is what happened. Once the President's public announcement was made on July 29, 1955, the Office of Naval Research withdrew Orbiter and merged with Vanguard, but the secrecy mania had already resulted in a good deal of wasted time and effort. How many other duplicate research programs are being carried on under these conditions is something about which you hear scientists making muttered guesses under their breath.

The book does, as Professor Oberth says, bring together a lot of odds and ends of information that you won't find elsewhere. The authors have an imposing background in aeronautics, and they seem to be most at ease when they are talking about high-altitude flight rather

than about interplanetary space. They have written a sound, very readable book that you can put in the hands of any scientifically-minded layman who wonders what the satellite program is intended to accomplish, and what is involved in putting a "bird" permanently outside the atmosphere. If you've kept up with the other rocket books, you may find only bits and scraps of new stuff yourself.

SPACE POLICE, edited by Andre Norton. World Publishing Co., Cleveland & New York. 1956. 255 pp. \$2.75

Marty Greenberg may have invented the "theme" anthology, but Andre Norton has certainly taken it over and made it all her own. The nine stories in this collection—four from this magazine—hang another scalp on her war-belt.

The title explains the theme; it is developed in three sections of three good stories each. In the first, we on Earth police ourselves—in the future. Roy L. Clough's "Bait" shows a cop involved in a politically ticklish case of impossible robbery, with a delightfully backhanded solution. Kendall Foster Crossen's "The Closed Door" is an ingenious but not quite convincing locked-room mystery, set in a hotel full of extraterrestrials whose highly peculiar characteristics are neatly employed in the crime and its solution. And James Blish's classic

"Beep" you'll remember as the story whose title contains the secret of a precognitive galactic police system, the solution to an espionage mystery, and a few other nuggets of useful information.

In Section Two we're being policed by outsiders. In George Longdon's "Of Those Who Came" there is a British contribution, in which an agent from Sirius tracks down and destroys two outlaws with the ruthlessness of a Micky Spillane or Peter Cheyney operative. "Police Operation"—here in 1948—is one of H. Beam Piper's excellent stories of the Paratime Troopers, keeping tourists in line in a system of parallel time-worlds; Verkan Vall must destroy a Venusian nighthound, ravaging a time in which it shouldn't exist, without giving away its extra-terrestrial source. Ralph Williams' "Pax Galactica"—here, 1952—points up the unexpected results of putting the lid on a vigorous society.

The last section, "Galactic Agents," has some of the best stories in it. L. Ron Hubbard demonstrates his skill as a story teller in "Tough Old Man," a yarn about the breaking-in of a Frontier Patrol greenhorn which telegraphs its gimmick without at all spoiling the story. James H. Schmitz's "Agent of Vega"—here, 1949—is that fantastically involved counter-espionage story about Zone Agent Iliff and the Lannai woman trainee on a set of most unpleasant worlds; it makes Eric Ambler's best look simple. And,

finally, Jack Vance's "The Sub-Standard Sardines" is a lightweight, amusing Magnus Ridolph yarn about a problem of industrial policing in an extra-planetary sardine cannery.

These are police-action stories, rather than mysteries of the "Caves of Steel" variety. Perhaps Andre Norton will put together one of those, too.

MEN, MARTIANS AND MACHINES,
by Eric Frank Russell. Roy Publishers, New York. 1956. 191 pp.
\$3.00.

This has the characteristic smell of a book printed in Great Britain—will Ted Carnell or Arthur Clarke please explain?—and, I hope, is the first of many such American reprints of good British science fiction. From all reports, the hosts for the 1957 World Science-Fiction Convention now have the world's healthiest market for hard-cover sf.

These are the four stories about the spaceship *Marathon* and its crew of men and Martians—and Jay Score. Most or all of them first appeared here: in fact, the Day "Index to the Science-Fiction Magazines" gives us "Jay Score" in May 1941, "Mechanistra" in January '42, and "Symbiotica" in October '43, with no source for the final episode, "Mesmerica." Since my memory doesn't place it, and the book gives no credits, we'll let it go.

These are straight, unostentatious space-adventure yarns of the vintage popular in the early '40s, breezily written and good fun to read. "Jay Score" introduces the crew who will later man the *Marathon*, trying to save the old tub *Upsydaisy*—beg podden, *Upskadaska City*—from plunging into the Sun. It has a classic twister at the end. In "Mechanistra" they are all aboard a Flettner-drive experimental ship, on man's first adventuring into the far corners of the universe. They become involved with a race of machines and need all their mental and physical powers to get out intact. "Symbiotica" finds them on a symbiotically organized world, whose "people" have a strange partnership with trees and other plants. And in "Mesmerica" they have tangled with critters which hypnotize them into believing they—the critters—either are something else, or just aren't there.

In every case, Jay Score's peculiar abilities—which I won't reveal, in case you come green to these tales—and those of the pleasantly unpleasant Martians are used in full to save the day. It's an old and popular formula, happily applied.

THERE IS LIFE ON MARS, by Earl Nelson. Citadel Press, New York. 1956. 145 pp. \$3.00

Frankly, I expected this little book, which comes from the publisher of some of the wilder-eyed

flying saucer books, to "reveal" some occult experience such as a psychic conversation with a highly placed Martian. Actually, it is an elementary and quite straightforward summing up of what we know about the planet, saying no more and quite a lot less than other similar books in the field. By way of illustration, there are only two pages of Mount Palomar photos, a Schiaparelli map of the North Polar area—which I was glad to have—and on the jacket a reproduction of a British Astronomical Association map of Mars on the Mercator projection, in colors which I suspect are the publisher's.

The momentous revelation that there *is* life on Mars refers only to the lichenlike forms of vegetation in which, I think, most of us believe.

Without comparing details with a book like Vaucouleurs' "Physics of the Planet Mars," the writer's facts seem to be facts, and his conclusions orthodox. However, it seems to me that he has either missed the point of D. M. McLaughlin's volcanic theory of the Martian dark-colored areas, or, more probably, that he has seen only magazine and newspaper accounts of the theory. This may also be true of you, as it has been of me: most of us do not have access to the astronomical journals where McLaughlin's papers appeared. It can also be remedied now, for most good libraries have *The Scientific Monthly*, whose October 1956 issue

(pages 176-188) has a good summary of McLaughlin's ideas: "New Interpretations of the Surface of Mars."

The author is Professor of Astronomy at the University of Michigan, though an expert on stellar spectra rather than a planetary observer. He has been working since 1951 in the field of geology, and his approach to areography is that of a geomorphologist who is trying to find geological explanations for the observed formations on the Martian surface.

As you know, a band of dark color extends around Mars just south of the equator, and extends north of it for a short distance—approximately 20° —into the desert. The sketches and maps of nearly all observers show that this dark area has a banded pattern of narrow, curved stripes—red and green more or less alternating—that in the case of the dark bands seem to start with sharp points, extend from northeast to southwest in an expanding fan, then curve sharply to the left at or below the equator and continue in a northwest-southeast direction.

This, McLaughlin points out, is exactly the pattern which the monsoon winds of the Martian southern summer should follow, since there are no seas to deflect or distort the simple planetary flow. They start in the northern hemisphere as northeasterly trade winds, then, crossing the equator, are deflected to the left by the Coriolis forces of the planet's

rotation and become northwest winds. In the northern summer the pattern should be reversed, but the winds will be weaker and it is reasonable to suggest that the pattern set up in the southern summer will predominate.

Having given us a source for the geometry of the pattern of dark areas, McLaughlin now adds a source for the color: dark volcanic ash, spewed out by active volcanoes located at the pointed source of each dark stripe. This, he proposes, is distributed in the long, curved lanes that we see, and is constantly renewed so that the frequent storms of red or yellow dust from the desert don't cover it. Indeed, it has to be renewed, no matter what your theory, or dust clouds like the one which covered most of the visible planet during last fall's opposition would reduce the entire surface to one color.

The weaker northern winds may even explain, in part, the "canal" patterns, McLaughlin suggests. The fallout might at first form a narrow, continuous band emanating from the volcanic peak, then grow hazier with distance, and finally break up into dots and patches as sand drifts across it. (Why some "oases," which McLaughlin equates with the sites of volcanoes, should show bands of ash extending out in three or four directions, I can't see.)

Seasonal changes, McLaughlin admits, are not explained by this theory: we know no reason at all why volcanoes should be active in

an annual rhythm, shifting neatly from hemisphere to hemisphere with the seasons. The ash streaks may absorb such moisture as is in the air in "spring," and darken, or they may be fertile zones in the midst of sterile sand wastes, where Martian vegetation can and does grow. In the latter case, we are right back where we started, with the dark areas as regions of vegetation, and have gained only a geological—or areological—reason for their shapes and locations. (H. C. Urey has proposed that the point sources are springs, from which moisture is distributed by the winds, rather than ash.)

If the yellow cloud did not obscure too much, too long, last fall, we should very soon be getting further evidence on this and other Martian questions, for the results of the year's studies are to be reported and pooled at an international conference this spring. Meanwhile I commend the McLaughlin article to you, plus any of the forty items in his bibliography that you can find in your local libraries. As for the Nelson book, it's the most elementary of its kind and may convince some doubters on general

principles, who know nothing of the kindergarten facts about Mars.

RECENT REPRINTS IN PAPER COVERS

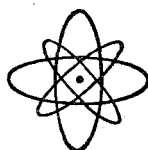
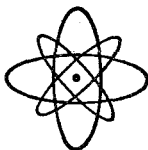
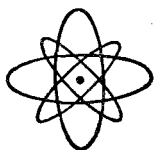
Harrison Brown, *THE CHALLENGE OF MAN'S FUTURE*. Compass Books, \$1.25 (Viking Press). About the best-reasoned study of the Malthusian problem of population that outruns resources.

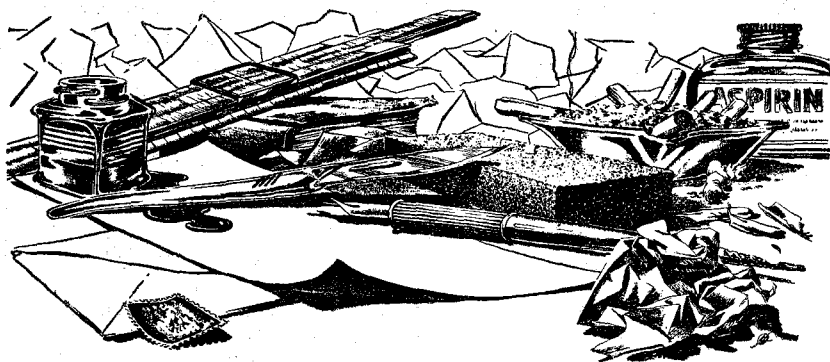
George Gamow, *THE CREATION OF THE UNIVERSE*. Compass Books, \$1.25. A classic which may not take in all the most recent work in astrophysics, but graphically represents one major school of thinking.

Groff Conklin, ed., *SCIENCE FICTION OMNIBUS*. Berkeley Books, 35¢. Eleven stories from the Crown anthology of 1952. This was one of the best selections by a nearly infallible editor.

John G. Schneider, *THE GOLDEN KAZOO*. Dell, 35¢. Borderline, if you like. It describes how the advertising agencies will take over the 1960 Presidential election.

THE END





BRASS TACKS

Dear Sir:

In recent months you've been toying with the notion that there exist machines—or tools—which operate upon some mysterious parapsychological principles. You've given specifications on the construction of one such machine and conclusions which were quite interesting.

But if there exist machines which give inexplicable results from the viewpoint of modern physics, there exist also certain mathematical con-

cepts which seem to give results which are inexplicable from a mathematical viewpoint. Consider the imaginary, $\sqrt{-1}$, denoted by i . Note that:

$$\begin{aligned} i^{4n} &= 1 & i^{4n+2} &= -1 \\ i^{4n+1} &= i & i^{4n+3} &= -i \\ && \text{for all integers, } n \end{aligned}$$

Now consider the square root of the imaginary, $i^{1/2}$. Remembering that when multiplying identical bases of unequal powers, we add the exponents, we find:

$$\begin{aligned} -\frac{1}{i^2} &= (-1) \frac{1}{i^2} = i^2 \cdot \frac{1}{i^2} = \frac{4}{i^2} \cdot \frac{1}{i^2} = \frac{4+1}{i^2} \\ &= (i^4 : i)^{\frac{1}{2}} \\ &= (1 : i)^{\frac{1}{2}} = \frac{1}{i^2} \\ \therefore -\frac{1}{i^2} &= \frac{1}{i^2} \end{aligned}$$

From an algebraic viewpoint, the foregoing equations and conclusion are quite correct. However, we find ourselves embarrassed with the impossible result that a positive something is equal to negative itself.

As far as I know, this is not an

example of a sly mathematical trick, whereby both sides of an equation, for instance, are divided by zero to yield one equals two, or the like. It may be argued that I have written nothing more than the absurdity:

$$-\sqrt{-1} = (-1)\sqrt{-1} = i^2\sqrt{-1} = \sqrt{i^4}\sqrt{-1} = \sqrt{1}\sqrt{-1} = \sqrt{-1}$$

But if this is so, then the exponents of the imaginary cannot be associative during multiplication, (i.e., $(A)B \pm A(B)$) and the argument that the imaginary is an inexplorable quantity from a mathematical viewpoint still holds.

It is interesting to note that the imaginary has been associated with dimensional analysis for the last century, and that the Minkowski space-time continuum, as employed by Einstein in his Relativity papers, is composed of three real dimensions and one dimension which is multiplied by the imaginary. Is it possible that the psionic phenomena with which you are concerned involves dimensions which are multiples of fractional powers of the imaginary, such as $i^{1/2}$?

Such speculation immediately inspires more advanced speculation: 1) Can it be that the Universe is composed of more than four dimensions, and can the additional dimensions be treated mathematically as is suggested herein? 2) Further, can it be that the concept of dimensions may be algebraically

defined in terms of fractional powers of the imaginary?

Having already investigated such speculations, I conclude that the Universe having three real dimensions, one imaginary dimension, and one dimension multiplied by $i^{1/2}$ must appear to be curved, since there exists no general set of orthonormal vectors in such a space. (That space is curved is an assumption of General Relativity.) Furthermore, assuming that every possible fractional value of i defines a direction—not necessarily independent from all possible directions—I have concluded on a purely abstract argument that space must be composed of three independent real dimensions, four dependent imaginary dimensions, and any number of dimensions multiplied by more complex powers of i . However, the math gets tedious along both lines of investigation, and I am frankly unqualified to interpret my results. Perhaps my boasts will inspire investigation by brighter minds than mine.

Hoping that the imaginary stirs up somebody's imagination, I re-

main.—Walter Yergen, 4715 Hudson Avenue, Washington 23, D. C.

I like Bob Bloch's comment "There's nothing to this telepathy business. It's all in the mind."

Maybe we should, equally, say "There's nothing to that mathematics—it's all imaginary."

Dear JWC:

There is an old conundrum that goes: If a man riding on the front of a flatcar of a train going 60 miles an hour fires a gun, whose bullet travels 60 miles an hour, towards the rear of the car at a man standing there, will the bullet hit the man?

I have seen published answers to that question that declared that the bullet would *not* hit the man; that it would fall straight to the ground. This is, of course, absurd, for we have here a closed system and the train's velocity need not even be considered. If the bullet will hit the man when the train is stationary, it will hit him even when the train's velocity is equal to that of the bullet. The bullet falls straight to the ground, sure, but the man runs into it.

Now to probe somewhat deeper into that problem. Suppose that the man on the rear of the car fires a like gun at the front man; will the bullet hit him harder than if the train were stationary? We are tempted to answer categorically that it will not, but we shall see that it

is not as clear as we might imagine.

Relative to an observer on the ground, Og, the bullet now travels at 120 miles an hour. If the bullet at 60 mi/hr has a kinetic energy equal to K , at 120 mi/hr its energy is equal to $4K$. Therefore, to Og, the bullet travels at 120 mi/hr and slows to 60 mi/hr when it hits the man. Before impact it has $4K$ foot-pounds energy; after impact it still retains K foot-pounds energy. Thus, relative to Og, $3K$ foot-pounds energy are expended in the impact. But to an observer on the train, Ot, the bullet hits at 60 mi/hr and becomes stationary, so that only K foot-pounds energy are expended in the impact. Who are we to believe; Og or Ot? How hard does the bullet hit? What faulty observation did Og make that led him to the wrong conclusion?

To change the problem somewhat, we know that if two automobiles run into each other head on, both going 30 miles an hour; only half as much total energy is expended in the impact as there is in the collision between a car going 60 and a concrete retaining wall. Traffic accident records will verify this. Also if a car going 70 mi/hr runs into the rear of a car going 60 mi/hr in the same direction, as much energy will be expended if the same car, at 36 mi/hr ran into the second which was parked.

All this leads up to my real problem.

Some day, man will, no doubt, construct a manned space station. It

will have to be supplied by shuttle rocket ships. These ships will probably come in conjunction with the station through a common air lock to unload their supplies.

Let us picture this conjuncture in our minds:

The space station, 1,075 miles up, moving at 15,840 mi/hr is being approached by the supply ship. This ship, weighing 66.4 tons, moves at 15,840 mi/hr plus one ft/sec necessary to catch the station; since both move in the same direction of travel.

The ship is to ease gently, nose first, into the air lock at the hub of the station, the air lock being equipped with shock absorbers to bring the ship to a slow halt. I can picture this now; the ship eases gently into the air lock, the shock absorbers slowly give their full limit, the girders supporting the air lock slowly give, and the entire hub of the station very gently tears away. The ship, scarcely slowed creeps toward the rim of the station, gently but inexorably plowing on through the rim to go unabated on its way.

This happens because the shock absorbers were designed to bring the ship gently to a halt when it had a velocity relative to the station of one ft/sec; that is, to dissipate 66,400 foot-pounds energy. However, the ship slowed from 23,233 ft/sec to 23,232 ft/sec and no less than 1,756, 276,000 foot-pounds energy must be dissipated. If the lock had been on the ground and the ship taxied into it at 110

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Now, where can you learn these so-called secrets? Well, there are many schools. I happen to be President of one of the oldest, and while I am naturally prejudiced, I honestly believe we have the best course and the most helpful instructors in the business. Our students and graduates say the same thing. True, not everyone succeeds, but many sell when only halfway through the course, and many more become full-time professional selling writers.

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mi/hr, the same amount of energy would be expended.

If a construction worker on the station was working out in space, and noticed he was drifting toward the station, at say, the same one ft/sec, he would find it impossible to stop this drift when he came in contact with the hull of the station. He might as well stop, with his arms, on earth, an eight-million-pound freight train coasting at one ft/sec.

I can imagine many more seemingly ludicrous events happening. But this letter is already far longer than I intended, so suffice it to say that these events are more deadly than preposterous.

I'm certain there is a fallacy in my thinking, John, but what is it?—W. H. Plummer, Altoona, Iowa.

Maybe the fallacy is in $1/2$ MV?

Dear John:

I do wish I had mentioned a gander in "Pate de Foie Gras." The fact that I didn't can be attributed to several reasons.

a) I just took it for granted, the way I would take a certain something for granted if I happened to discuss a pregnant woman.

b) The fact that I am a city boy made me less conscious than I ought to be that a fowl lays eggs constantly and that in the absence of a male fowl they are unfertilized.

c) I *never* bring sex into my stories.

Anyway, I am very satisfied with the response to the feature and only hope my serial doesn't come as an anticlimax. As for how the Goose manages to excrete gold before maturity, why one can only say that the enzyme doesn't develop until the sex hormones which control the development are secreted—and those also control the growth and development of the ovary.—Isaac Asimov.

Isaac is more accustomed to dealing with positronic robots, I guess.

Dear John:

I'm not a writer of letters to the editor. I've been reading stf for thirty years now, and never wrote one before, but I wanted to thank you for publishing the story by Christopher Anvil, "Pandora's Planet." This tale tickled me more than any story has for many many years!

Not content with this, you have to follow it up with another gem from the always amazing Asimov, with his Goose story! Two such gems in the same issue I can't believe! Anyhow, I just had to let you know how much I appreciated both of them, especially the Anvil story. I have read it two times in succession, and it is still just as funny as it was in the beginning. I like especially the part where the Invaders were unrolling the barbed wire! May I also say a word in appreciation of the wonderful cover

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by Mr. Freas? If I remember, you have had several covers along the same line; he has a gift for drawing believable aliens. I liked this big red-furred character the minute I saw him!—Jack Darr, Mena, Arkansas.

I loved that yarn myself!

Dear Mr. Campbell:

Re the problem of the goose. You need only transplant undeveloped ova to the ovaries of normal geese, fertilize them parthenogenetically—which I assume you can do or you wouldn't have tried to hatch the eggs of a goose that had never seen a gander—and get eggs without gold poisoning which hatched to give descendants genetically identical to "The Goose."—A. C. Knight, 3409 Oaklawn, Victoria, Texas.

Nice try, but no cigar. How do you get the undeveloped ova without seriously threatening the life of The Goose, and almost certainly destroying any possibility of other approaches?

Dear "X":

I find it hard to head a letter thus, but I presume that you are not being so anonymous as to refuse to accept your own mail. In choosing Isaac Asimov to transmit your plea, you chose a good man, for his well-known report on thiotimeline shows

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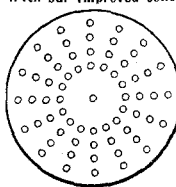
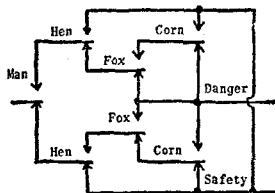


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how clearly he can present a technical topic. Incidentally, I am not aware of any previous serious attempt to commercialize thiotimoline, although I've read some ideas; so perhaps I'm first. Soon, you shall see a more-than-instant coffee that picks you up before you drink it, enabling you to behave decently to your wife as well as your office-mates in the morning.

Your problem of the Goose as stated has the logical beauty of a really good Agatha Christie story. All the factors necessary for solution are presented without undue attention being paid them: it remains only for M. Poirot to exercise the little gray cells to pick them out and state the solution.

Par example:

1. The Goose utilizes the reactions $O^{18}-Fe^{56}-Au$ to produce gold.
2. The gold is excreted in/about the ovaries where it forms a capsule for the eggs.
3. Although, the Goose can keep its gold level down, the eggs are poisoned; hence—sterile.
4. While the Goose took in excess O^{18} , it produced still more gold.
5. You want more Geese.

Donc:

Presumably, the Goose would produce less gold if she took in less O^{18} . Put her on a reduced O^{18} intake, and perhaps she'll stop poisoning her eggs. It would be expensive.

The trait is probably dominant,

since it showed up in the first generation, but another approach would be to inbreed the rest of the flock and observe hopefully.

Once the strain is in production, several secondary problems arise; e.g.,

1. At which age does gold production begin; if before puberty, how is it disposed of then?
2. What happens in Ganders?

With more than one gold-layer, a name for the Goose is in order: how about Gildova, or—if that sounds too Russian—simply The Aurigenal?

In closing, unless the Goose's transmuting enzymes are catholic in their choice of substrate, you might find yourself saddled with the problem of protein synthesis before you can control any reaction useful in disposing of AEC wastes.—William Boniface, 36 Faculty Lane, St. Louis 5, Missouri.

P.S.: If the trait is dominant, the Goose is heterozygous. There are several characteristics useful in the heterozygote which are detrimental or downright lethal to the homozygote; the sickle-cell trait of human beings is seemingly one such. I should treat a homozygous Goose very cautiously and observe inbreeding pairs from a safe distance, behind shielding.—WRB.

You have presented a very aurigenal problem here—the homozygous type might indeed vanish, under critical conditions, with a perfectly goosely bang.

(Continued from page 7)

actions which are "not scientific," then there must, necessarily, be a criterion by which the "scientific" may be distinguished from the "unscientific." If there is no such criterion—then we have a gaseous system, having no boundaries, no organization in fact, and incapable of use as a structured system.

If there can be such a thing as "an unscientific idea," this can be true only because it exists outside a bounding criterion that marks the limit of "scientific."

Then this means that the scientific method is limited.

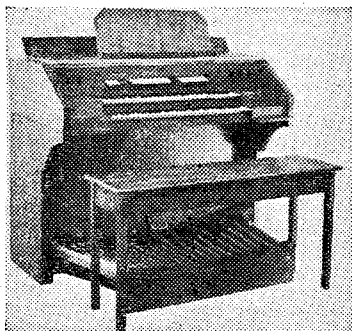
And this means that problems can exist which are inherently not solvable by the limited Scientific Method.

The concept "Scientific Method" is, then, faced with a dilemma. Naturally, we want an unlimited method that can solve any problem whatever. But an "unlimited method" is a nonsense phrase; if it is unlimited, then anything, everything, without let or hindrance of any kind, is a member of the class, and it isn't a method. If there is no limit whatever on its ability to handle concepts, then wild guesses, magnificent delusions, any wild opinion, is equally a proper member of the class. My opinion on any subject is as valid as anyone else's, and my way of thinking is just as much a proper member of the Unlimited Method as any other way, and no one has any basis for denying my conviction that I am God, and creat-

LIMITATION OF METHOD

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ed the world around me, and you just *think* you're doing what you want, because really you're doing it because I ordained it.

The Psychotic Method is, in fact precisely what Mankind is seeking to achieve—an unlimited method of thinking about problems. With one slight difference; we want and need an unlimited *but structured* method. The Psychotic Method is an unlimited *and unstructured* method. The Magical Method differs from the Scientific Method in achieving a valid result by making a wild, unguided and unstructured leap into the Unknown, and landing on something useful. (The Magicians who don't land on something useful aren't heard from subsequently. It is, actually, a trial-and-error method.) The Magical Method is a perfectly valid one; it works. It produced quinine, digitalis, curare, opium, and a dozen other entirely valid drugs that would never have been achieved as early as they were if we had had to wait for the advance of the Scientific Method.

Any pure trial-and-error worker is using the Magical Method. It produced Damascus Steel—and it produces every new hypothesis and postulate that Science uses. Newton didn't *derive* the Law of Gravity; he achieved it by the Magical Method. However, he then built a logical bridge of a sort from the point he had landed on to conventional mathematics. He never proved that his Law of Gravity could be derived from known data; it

couldn't, and it can't today. All he—or anyone since—has shown is that *if* you accept the postulate, *then* you can make useful predictions. But *why* you should use that postulate in the first place—no one can show.

Any scientist will react with the usual human resentment when told that the Scientific Method is inherently limited, that it can never in all time to come solve certain problems. The fact remains that that is true; there are problems that the Scientific Method, as we know it, can *never* solve. Because to deny that, we must hold that any method that works to solve any problem is a member of the class Scientific Method—and, since we cannot now define those new methods, we would be forced to convert the Scientific Method of structured thinking to the Psychotic Method of unstructured thinking to achieve it!

The point of difficulty is this: The Scientific Method is structured *only as far as we have now gone*. Sticking to *that so-far structured system*, there are problems which *those* techniques will never, in all time to come, be able to solve.

The forever-insolvable-by-those-methods-problems will be solved in the future, by what will, in that future time be called "The Scientific Method." But those solution-methods will involve the use of yet-unstructured techniques of thinking. To solve those insolvable problems *now*, using those yet-unstructured techniques, we must use either the

Psychotic Method or the Magical Method.

No scientist, *as a scientist*, can do it. In some future time, when yet-unstructured methods have been developed and structured, scientists will be able to do it. But they will do it by methods which are, right now, unscientific, Magical or Psychotic.

At any instant of history, the Scientific Method is limited; the individual who can't distinguish between a structured thought-process which properly belongs within the class "Scientific Method" of his time, and a yet-unstructured Magical or Psychotic method thought-process, is using the Psychotic Method, whether he knows it or not.

The Magical Method involves using an unstructured method, with full realization that it is unstructured, and with every intention of structuring that method as soon as possible.

All basic, fundamental discovery is made by the Magical Method.

The Scientific Method can develop an already-structured area. But it can not explore a new and unstructured area. It can derive consequences of known structures of thought-process, but cannot invent new thought-processes that are not derivable from the known process.

The Scientific Method, at any given instant of history, is limited by the fact that it is defined as being a structured method of problem-analysis. The methods that have not yet been structured are, at that

given instant of history, defined as "unscientific."

But, at any given instant of history, a scientist will believe—and cite evidence—that the Scientific Method is unlimited, in that Science can, eventually, solve any problem.

That statement is nonlogical, unscientific—and true. It is both true and false. Since Logic cannot handle a concept which is both true and false, the statement is nonlogical. It

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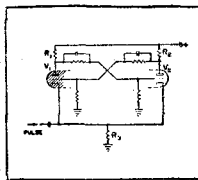
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LIMITATION OF METHOD

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is a both-true-and-false statement because only the Psychotic Method is *now* unlimited, so saying that the Scientific Method *is* unlimited makes the Psychotic Method and the Scientific Method identical, which is false. But the Scientific Method can grow, structuring new areas that are now unstructured; therefore it *will* be able to overcome any named problem, although it *can* not.

This point is both subtle, and extremely important. By analogy, we can put it this way: Tom Jones is ten years old. No ten-year-old boy can understand the meaning of adult man-woman love. Therefore Tom Jones *as he is* can *never* understand adult man-woman love. But Tom Jones will, if he is normal, grow, change, become a different type of entity known as a man. And a twenty-five-year-old normal man *can* understand adult man-woman love.

Therefore it is true that Tom-Jones-to-be can understand the problem, but that Tom-Jones-as-he-is is inherently incapable of ever understanding it.

Science will, eventually, understand the problem of antigravity. But Science-as-we-know-it is inherently incapable of ever understanding it. The problem can not be expressed in any terms *now* known. Science must grow, change, cease to be the kind of entity it now is, and become a quite different organization of concepts before it can handle the problem.

One major part of the difficulty

of expressing this problem is that it happens to represent one that Science-as-we-know-it *is* inherently incapable of handling! Science-as-we-know-it is based on Logical thought. Logical thought, however, has the concept "inconsistency" so defined that it is "inconsistent" to state that a single statement can, in a single frame of reference, have two nonidentical truth-values. A statement cannot, in Logic, be *both* or *neither* true and/or false.

If I make the statement "Science as we know it can never solve the problem of antigravity," however, the statement is *both* true and false.

With this background, we can formulate a predictable, useful process. If we define the organized, accepted, defined Scientific Method *as it now is*—what is and what is not acceptable in modern formal scientific journals, professional scientific meetings, professional scientific formal discussions—we can predict accurately **some** classes of problems that *that method* can *not* analyze or solve.

This immediately gives us a class of problem-areas where real problems undoubtedly exist, but which the professional scientist, using accepted scientific analytical methods, cannot explore. Problems in those areas would be classified as "scientifically impossible," because with respect to *now*-scientific thinking, they are "unthinkable."

Necessarily, there must be areas which Science-now cannot solve. If

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there weren't, that would mean that Science had no possible future growth, that Science was fully mature. And recognize clearly what "mature" means; it means that the full, ultimate growth of the entity has been achieved, and that the only further change possible is senescence and decay.

A careful analysis of Science-now should, then, make possible specification of areas which the now-method cannot solve, and would show *why those areas were inherently insoluble*.

This would amount to a specification-by-negation of a major area of possible important creative work. It would specify the areas in which the Magical Method could be fruitfully applied.

Wayne Batteau, of Harvard, has pointed out that necessarily the great contributions to human understanding must be made at the boundary between the Known and the Unknown. You can't contribute anything new if it is already within the area of the Known; if the material is so far out in the Unknown that it can't be linked to the Known,

the Magical Method can still find it—but it can't be incorporated into the Known because no bridge can be built. It will be something that you can conceive, perhaps, but something that you can not communicate or teach.

Incidentally, I have been thoroughly irked by the thick-witted oafs who maintain that there is nothing *real* that can't be clearly explained and taught. Try explaining clearly and teachably the full mechanism by which a wish in your mind causes your finger to move. Until you can do that, in completeness sufficient to cure a man suffering from hysteric paralysis for instance, please refrain from making any bull-headed statements about the ease of explaining anything you can *really* do.

All evolution has been achieved by the Magical Method; we're trying hard to develop a Science that can catch up with what has been achieved by Magical Method work. You *can* synthesize complex proteins, but you neither *know* how, nor can you do it as a scientist. I'd be most happy to have you make a

liar of me on that one; you're cordially invited to do so.

What we need is a way of determining fruitful areas of exploration where important creativity can be achieved rapidly. I suggest that one method is to study what types of problems the Scientific Method has, inherently, denied, and take a careful look into those areas.

To give an indication by examples of what I mean:

1. Logic is the basis of the now-method of Science. Logic so defines "inconsistent" as to make that definition precisely equivalent to "simultaneous." Therefore Science cannot handle the problem of simultaneity so long as it remains limited by the present definitions of Logic. This means that Science will—so long as the Logical limitation remains—duck or, in one way or another deny simultaneity. Vide Relativity.

2. Currently, Science is limited to discussions of two, and only two, types of interval: distance and time. There is another type of interval with which every human being is fully aware, but which cannot be discussed in Science-now; that is the interval-concept implied in the term "relevancy." *How closely related* is A to B? Most present arguments of opinion revolve around the inability to develop a mensuration of that dimension of interval. Notice that relevancy is totally non-related to time or distance. (Page Dr. Rhine!) My daughter remains precisely as much my daughter

whether I am here on Earth, or somehow removed to the Lesser Magellanic Cloud. She will also be my daughter to precisely the same extent when I'm eighty and she's fifty. And if some grubbing archeologist finds this page somehow miraculously preserved ten thousand years hence—the relationship will remain precisely as valid from that time-viewpoint.

Relevancy phenomena may well follow some inverse square law—but not one based on distance or time parameters. Distance and time are irrelevant to that interval-measure.

3. Currently, "purpose" is a dirty word in Science. This makes an adequate definition of living entities impossible in proper scientific company; living entities have purpose, which sets them apart from non-living things. Psychology, therefore, isn't getting forward very rapidly, since purpose and relevancy are two of the major parameters necessary in analysis of human problems. A human being's reactions cannot be expressed in terms of space-time parameters alone; the effort to do so will forever be futile. Men react also on the basis of the *relevancy* of a situation to their *purposes*.

4. Korzybski had something in his indictment of Aristotelian logic . . . but he didn't know what it was he wanted instead. The problem is that we have no method of handling a discontinuous variable. Formal logic works fine on discontinuous constants; Claude Shannon showed

that it was ideal for working out complex relay switching problems. Modern mathematics can handle continuous variables very well indeed. But neither can handle discontinuous variables. Instead, each seeks to interpret the discontinuous variable by infinite approximation. This works fine, if a few-step approximation works satisfactorily, but when a few hundred approximation steps are needed, the thing becomes a fine theory that can't be practiced. Most problems of the real world are, however, discontinuous variables. It's the poor fit between the discontinuous constant analysis of Logic, and the discontinuous variable of real life, that Korzybski was complaining about.

5. Science doesn't allow cross-interaction of its various branches. It is normally held that a chemist has no business trying to tell a physicist something about physics because he isn't an expert in that field. The need for cross-interaction is, currently, receiving a small but increasing recognition.

It is necessary, however, to add a warning: if you do go to work on this basis, and work out an extra-scientific hypothesis that leads you to the successful development of a functional device—you're in for real frustration. By the nature of the process by which you arrived at the idea, it is "scientifically impossible," or "logically inconsistent and nonsense." Obviously this must be true, if you have deliberately and knowingly sought to explore an area

which Science-now holds to be non-scientific.

Suppose you successfully develop a *framis*, which operates on non-logical and therefore unscientific principles.

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tally unskilled operator, by pushing the button on the framis, can instantly get directly visible results with 99.99% probability every time will the device be acceptable.

The essence of the problem is getting *instantaneous* results. "Coincidence" is a time-based concept. If time-span can be eliminated, the "coincidence" explanation of effects can be squeezed out.

That, of course, makes it a "simultaneity" problem again.

Incidentally, notice how the problem that can't be handled by the now-method is denied reality. Consider this problem:

Given: An individual having precognition perceives today that a certain specified card will, tomorrow, have a wave pattern on it, although this pattern has not yet been imprinted.

Problem: *When* does the perception occur?

Now-Scientific answer: This is a meaningless question, because the problem is unreal. Nothing of that sort could happen; only a hoax or a coincidence could produce such an appearance.

A similar problem arises in considering this problem: If, ten years ago, you had experiences A, B, C and D, and, this year, you have experience X which, interacted with the data of A, B, C, and D leads you to a new conclusion . . . *when* did you learn the lesson?

THE EDITOR.

THE END

—Continued from other side

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You Travelled Through Time to Taste **FORBIDDEN LOVE...**

YOUR name is Andrew Harlan and you *look* like other men. You have the same wants, the same emotions. There's one difference. *You were born in the 95th Century...* and you've travelled as far "upwhen" as the 111,394th! You see, Harlan, you are an **ETERNAL**... a trouble-shooter sent from a timeless realm to *change the course of history!*

Right now you're in the primitive "downwhen." You're here in the 20th Century on the most **VITAL** mission of your career. But you can't delay here, Harlan! *You've been ordered to board your Time Kettle and...*

Why are you hesitating, you **FOOL**? *Is it the girl?* Is it the lovely Noys Lambert, with the seductive body of an evil goddess? Better get going! As an Eternal you belong to an inflexible priesthood which forbids romancing with a woman! **YOU CAN'T HAVE HER.** And, what's more... **YOU'VE GOT TO KILL HER!**

Hurry, Harlan! That "blaster" you have leveled at her heart will erase Noys Lambert **FOREVER!** Maybe you **DO** love her... Maybe you **DO** want her. So what? It's too late for that! **You must kill her RIGHT NOW... OR CAUSE THE END OF ETERNITY!**

But perhaps... perhaps she'd be worth it....

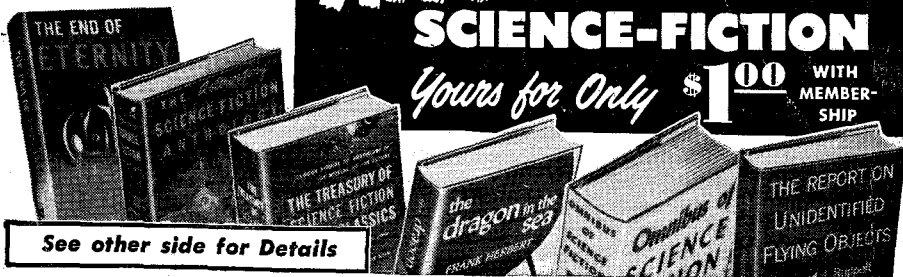
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MUST MURDER HER!**



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